DOCUMENT RESUME

ED 109 594 CS 001 903

AUTHOR	McGuigan, F. J.; And Others
TITLE	A National Field-Test of Selected Programmed Reading Materials for Undereducated Adults. Center Research Monograph No. 3.
INSTITUTION	North Carolina State Univ., Raleigh. Adult Learning Center.
SPONS AGENCY	Bureau of Adult, Vocational, and Technical Education (DHEW/OE), Washington, D.C.
PUB DATE	Nov 72
GRANT	OEG-0-70-4599(324)
NOTE	161p.
AVAILABLE FROM	Adult Learning Center, P.O. Box 5096, North Carolina State Univ. at Raleigh, Raleigh, North Carolina 27607 ($3.00 paper)
EDRS PRICE	MF-$0.76 HC-$8.24 PLUS POSTAGE
DESCRIPTORS	*Adult Basic Education; *Programed Instruction; Programed Materials; *Program Evaluation; *Reading Instruction; Reading Materials; *Reading Programs; Reading Research; Student Characteristics; Textbook Evaluation

ABSTRACT

In the summer of 1971, the Adult Learning Center decided to conduct a one-year, research-based field test of programmed instructional materials specifically designed to teach disadvantaged adults to read. The four programs tested for effectiveness were Programmed Reading for Adults, Building Reading Power, Reading Series, and Building Your Language Power. An attempt was made to assess the effectiveness of each program as a function of such student characteristics as intelligence, degree of motivation to study, ethnic group, and whether English was the student's first language. Additionally, students and proctors were asked to evaluate the program each used. The general impression gained from examining the learning data--the primary criterion used--is that none of the programs was positively evaluated on all measures. However, the use of Building Reading Power and Programmed Reading for Adults leads to a satisfactory amount of learning. On the criteria of student evaluations, proctor evaluations, and error rates, only Programmed Reading for Adults may be judged to be a successful program. Complete testing data and detailed descriptions of the study design, results, and conclusions are included in the document. (TO)

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A NATIONAL FIELD-TEST OF SELECTED PROGRAMMED READING MATERIALS FOR UNDEREDUCATED ADULTS

CENTER RESEARCH MONOGRAPH NUMBER 3
An ALCequel Publication

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November, 1972
$3.00

ADULT LEARNING CENTER

The Adult Learning Center is an organizational unit in the School of Education at North Carolina State University, and is an integral part of the research and development program of the School of Education.

Established in 1967, the Center is committed to seeking new ways and means for facilitating the intellectual growth and development of adults. The multidisciplinary activities carried out by members of the University faculty associated with the Center are addressed to comprehensive and rigorous studies of the most pressing needs and problems confronting adult education. Among the objectives of the Center is the provision of national leadership in the development and implementation of experimental and demonstration projects which give promise of materially improving adult education programs. A major concern of the Center is the development and dissemination of packaged instructional materials and improved instructional methods which are capable of being institutionalized within operational adult education programs in public school systems.

The Center maintains on the campus of North Carolina State University an adult learning laboratory, the primary purpose of which is to further the use of programmed instructional materials among adults. Continuing research is conducted in the laboratory to determine the capacity of programmed instructional materials to effectively and efficiently raise the educational levels of adults.

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CS 001 903

ED109594

A NATIONAL FIELD-TEST OF SELECTED PROGRAMMED READING MATERIALS FOR UNDEREDUCATED ADULTS

U. S. Department of Health, Education, and Welfare
Office of Education
Bureau of Adult, Vocational, and Technical Education
Division of Adult Education Programs
Project No. 432028, Grant No. OEG-0-70-4599(324)

The research reported herein was performed pursuant to a grant from the U. S. Office of Health, Education and Welfare, Office of Education, Division of Adult Educational Programs. Grantees undertaking such research under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the research. Points of view or opinions do not necessarily represent Office of Education position or policy, and no official endorsement by that office should be inferred.

ADULT LEARNING CENTER
NORTH CAROLINA STATE UNIVERSITY
RALEIGH, NORTH CAROLINA
NOVEMBER, 1972

ACKNOWLEDGEMENTS

There are many people who deserve thanks for their cooperation in the materials evaluation project. Drs. McGuigan and Daniel, their staff, and members of the evaluation team in each of the five states, merit thanks. Furthermore, the cooperation and assistance of the leadership of local and State branches of national agencies, and State Departments of Adult Education must be recognized. Without their help the evaluation could not have been conducted. The names and institutional affiliations of those individuals who assisted in the conduct of project are presented below:

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Special thanks are expressed to Mrs. Betty Chapman and Mrs. Selma McEntire for typing the manuscript of the report and to Mrs. Elaine Hill for its final reproduction.

"--- you will, I hope, comprehend and accept as we do the need for thoroughgoing reform in education that President Nixon has called for, indeed that this Nation is calling for. Including of course, examination and reform of the fundamental conceptions underlying the published materials used in the schools.

"What this says to me is that we must be prepared to question the usefulness of all educational materials presently used in the schools, not going at the review in a destructive, negative fashion --- too often, the style these days --- but by not being satisfied that we have found the ultimate in teaching materials.

"Much of what is published and used in our schools is, of course, excellent and of undisputed value to the educational process. But I'm just as certain that many more materials are of dubious value, and at the very least, lack a reasonable basis in research to show that they are doing the job that needs to be done. We simply have to do better, all of us."*

---

*S. P. Marland, Jr., Assistant Secretary for Education, Department of Health, Education, and Welfare. Taken from "Educators, Publishers, and Federal Policy," a paper presented before the annual meeting of the Association of American Publishers, Castle Harbour Inn Motel, Bermuda, Monday, May 1, 1972.

PREFACE

In the United States there are 3 million adults who, for a variety of reasons, cannot read. Another 20 million adults who can read perform at a level so low that they may justifiably be described as functionally illiterate.

For many years educators have sought solutions to the problems of adult illiteracy. Of particular concern has been the identification and use of teaching methods and instructional procedures which will most effectively teach illiterate adults to read.

Current interest in programmed instruction as a method for teaching reading is traceable directly to the literary works of Professor B. F. Skinner in the mid and late fifties. An article in TIME magazine has hailed programmed instruction as "---the first real innovation in teaching since the invention of movable type in the 15th century." Throughout the country, many educators believed that Dr. Skinner had split the pedagogical atom and had found emblazoned upon its nucleus the words "programmed learning." We had at last discovered a research-based instructional method which, given time, would do everything from eliminating the tic in small children to teaching illiterate adults to read.

The distinguished psychologist, Dr. Lee J. Cronbach, began in 1962 urging educators to demand test data to demonstrate the effectiveness of the programmed instructional materials they were using. There is little reason to believe that educators have taken seriously the advice of Dr. Cronbach and lots of evidence to indicate they haven't.

With a grant from the Adult Education Branch of the U. S. Office of Education, the Adult Learning Center set out in the summer of 1971 to conduct a one year research-based field test of programmed instructional materials specifically designed to teach disadvantaged adults to read. The present report presents the findings of this field test.

A word of caution to the reader is appropriate. There is nothing in the present report which in any way validates or invalidates the programmed instructional approach to teaching reading. The reader is urged to remember that a properly constructed experimental tryout or field test of a program may provide an assessment of that particular program, but does not afford either proof or disproof of the value of the general method of programmed instruction. In her very excellent book, Learning To Read: The Great Debate, Dr. Jeanne S. Chall wrote: "Despite thousands of research studies and scholarly discussions on reading since the turn of the century, it has been difficult for researchers to state with any degree of confidence that one particular method or approach to beginning reading is really better than another."

The research discussed in the present report had as its single purpose the empirical testing for effectiveness of four particular programs designed to teach basic reading skills to marginally literate adults. All indications are that this purpose has been successfully achieved.

D. Barry Lumsden, Director
Adult Learning Center
November 1972

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PART I

PURPOSE, METHOD, AND GENERAL INFORMATION PERTINENT TO THE PROJECT

PURPOSE

The field of education has been deluged with instructional materials that are empirically untested as far as their learning effectiveness is concerned. Even in the relatively sophisticated area of programmed instruction, adequate validating data are lacking for the large majority of programs. For example, for only ten of a sample of 56 programmed instructional materials for teaching Adult Basic Education (ABE) students to read do the publishers indicate the availability of data as a criterion of learning effectiveness (U. S. Civil Service Commission, 1971). Needless to say, publishers' claims often fall short of standard validation criteria such as those specified by the Joint Committee on Programmed Instruction and Teaching Machines (1966).

The unfortunate situation, then, is that the consumer of educational materials typically must select his products on the basis of publishers' claims and of subjective reviews rather than on systematic, empirically-based evaluations. As Dr. Kenneth Komoski (1971) recently put it, "The largest single group of unprotected consumers in the U. S. consists of millions of students who are now deluged with more than 200,000 poorly tested textbooks, films, teaching machines and other complex learning gadgets" (p. 33). Komoski (1971) estimated that 99 percent of the nation's teaching materials have never been systematically evaluated on the basis of amount of students' learning. This lack of rigorous field testing of instructional materials is not, however, due to our inability to perform the task; on the contrary, we possess a variety of techniques for empirical assessment, e.g., McGuigan and Peters (1965).

The problem thus exists that, though we have educational materials in abundance and, though we possess the methodology for systematically and empirically evaluating them, we continue to expose our students to materials of questionable effectiveness. The consequence of ineffective materials is not just a waste of time for student and instructor, but the student's continued failure may also result in his development of negative attitudes toward learning. Perhaps such negative effects are even greater for the Adult Basic Education student than for the elementary or high school student, since the adult may make only one attempt to further educate himself after dropping out of school. For motivational purposes, the materials ABE students use should produce as much learning in as short a time as possible, and should also encourage him to continue in the ABE program. Since reading proficiency is necessary for the ABE student's further education, priority as far as instructional materials are concerned would be for those designed for the effective teaching of reading.

It is difficult to underestimate the seriousness and scope of the "reading problem" among ABE students. Those who cannot read, typically referred to as "functionally illiterate adults," are usually unable to function productively in our society. According to the 1960 U. S. population census, about 24,000,000 adults above the age of 24 years have less than an eighth grade education. The situation is actually worse than this since hundreds of thousands of disadvantaged students who have remained in school for 8, 10, or 12 years cannot read the newspaper, indicating that grades completed is a misleading indicator of the extent of the problem.

The federal government is confronting the problem of adult illiteracy with efforts to offer training under the amended Adult Education Act of 1966. Still, the problem remains sizeable even though more than 20 major pieces of legislation in support of adult education have been passed by the U. S. Congress. From 1966-1970 only 2,250,000 adults over the age of 15 participated in ABE programs (National Center for Educational Statistics, 1971). Hence, in spite of efforts by the federal government, still needed are more widespread and effective projects so that more than just a small minority of ABE students will make a successful effort to acquire basic literacy skills.

One of the difficulties with developing more effective and widespread learning projects is the frequent shortage throughout the country of instructional personnel and equipment. The priority in developing methods of instruction should be for those that can be used by the learner with relatively little support personnel and equipment. Programmed instructional materials seem to satisfy this requirement. In addition to the educational advantages frequently pointed out by experts in the fields of education and learning theory, programmed instruction requires a minimum of teachers' time and, when used in book form, has no hardware requirements. One possibility, therefore, is to increase the extent to which programmed instructional materials are used. Of approximately 536,000 students enrolled in ABE programs sponsored by the Adult Education Act of 1966, 178,821 (33 percent) were enrolled in classes in which programmed instruction was the primary educational method employed (National Center for Educational Statistics, 1971).

In short, the purpose of this research was to empirically assess the effectiveness of available programmed instructional materials for improving the reading proficiency of functionally illiterate adults. In attempting to accomplish this objective, it was recognized that a program's effectiveness varies with various characteristics of students. Consequently, an attempt was made to assess the effectiveness of available programs as a function of such student characteristics as intelligence, degree of motivation to study, ethnic group, and whether or not English was the student's first language.

REVIEW OF RELATED RESEARCH

In surveying previous efforts to empirically assess the effectiveness of programmed instructional materials for the teaching of reading to functionally illiterate adults, it became apparent that only a few systematic research projects had been conducted; even these resulted in limited empirically-based conclusions about program effectiveness. The main function of summarizing relevant reports here is to emphasize the dearth of reliable information in this area.

Expert Opinion ("Subjective") Evaluations

While the emphasis will later be on research in which student-based objective measures have been attempted, there is some value in such "subjective" procedures as those developed by Otto and Ford's (1966), A Check List to Evaluate Adult Reading Materials, or Adair's (1968) similar instrument, An Evaluative Instrument for Programmed Instruction. Such devices can provide profiles of readily observable characteristics obtained from an examination of the material and manuals. Check lists, as in the case of Adair's instrument, can provide numeric weight to the presence or absence of selected attributes and "allow meaningful, numerical underlying comparisons between any two P.I. courses or programs which might otherwise appear identical" (Adair, p. 2). Similarly, annotated bibliographies of programmed instructional materials provide some limited information about program characteristics. Some examples of these annotated bibliographies of programmed instructional material are the Southwestern Cooperative Educational Laboratory's publication, Adult Basic Education: An Evaluation of Materials (1971); Catalogue of Basic Education Systems (U. S. Civil

Service Commission, 1971); The Adult Basic Education Bibliography (1970); A Selected Annotated Bibliography of Instructional Literacy Materials for Adult Basic Education (1971)

While these "expert opinion" devices are useful in assisting the instructor to make a decision as to which program, out of those available, might be appropriate for his students, they do not provide objective, systematic information regarding program effectiveness from a learning point of view. Neither does the resulting information have the more general educational value of advancing research procedures for assessing the effectiveness of materials.

Objective Assessment of Programmed Materials

In 1966, Greenleigh Associates reported on a large scale field test conducted to determine the effectiveness of four learning systems to teach economically-dependent adults to read. The students were 1815 functionally illiterate individuals, defined as those with reading levels below the fifth grade. Samples were from New York, New Jersey and California. The initial reading level was determined by administering the Gray Oral Reading Paragraphs. The students studied two and one-half hours per day for 17 weeks in one of four learning systems, identified as "Learning to Read and Spell" (America Incentive to Read), "Reading in High Gear" (Science Research Associates), "The Mott Basic Language Skills Program" (Allied Education Council), and "Systems for Success" (Follet Publishing Company). The researchers attempted to form control groups but were unable to acquire a sufficient number of adults to comprise such a condition. The primary data were presented as mean gain scores (mean posttest scores minus mean pretest scores)

in reading achievement, computed on the basis of The Gray Oral Reading Paragraphs and by The Iowa Test of Basic Skills. Student attrition was 46 percent. The gains were tested for significant difference from 0, and analysis of variance was used to determine whether there were significant differences in student gain scores by reading systems. The primary conclusion was that "almost all students showed some gain in reading ability during the field test. However, there was no significant difference in student gain scores by reading systems." More particularly, they failed to find significant gains by The Gray Oral Reading Paragraphs, but did find some on the Reading Comprehension, Work Study Skills, Arithmetic, and Composite scales of The Iowa Test of Basic Skills. While the most positive results were statistically significant, gains appeared to be small and of doubtful practical significance. And, of course, an analysis to determine that a given gain is or is not statistically significant doesn't tell one anything about the size of that gain score.

Griffith (1967) rather vigorously evaluated the Greenleigh report, one of his criticisms being that students and teachers were not assigned to learning systems at random. Since the Greenleigh researchers took as a major purpose that of comparing effectiveness of the four systems, Griffith pointed out a most important confound. Consequently, the meaningful comparison of gain scores among the four systems was precluded. Griffith also pointed out that a number of "findings" were but casual observations or subjective generalizations, and the indication is that the main value of the Greenleigh report was to show the large number of variables that must be dealt with in

ABE field testing research. Thus, the Greenleigh report clearly established the difficulty of adequately dealing with methodological problems in this area.

In a relatively minor evaluation study of a reading system by Heding, Ames, Artley, Grimsley and Andrews (1967), 18 (53 percent) of 34 adults who were illiterate remained for the conclusion of the experiment after some 90 hours of literacy instruction. Only small and nonsignificant mean gain scores occurred for measures of word meaning, paragraph meaning and word study skills. There was, however, a significant increase on a measure of spelling.

Steuart (1968) conducted a study using 86 Spanish-speaking students who were functionally illiterate in English. They studied the Mott Basic Language Skills program and the Sullivan Programmed Reading for Adults. Steuart states that he was unable to establish a functionally illiterate control group within the confines of the Mexican-American population. The data indicated that achievement was significantly higher on the reading comprehension posttest for the students who studied the Sullivan program than for their Mott treatment counterparts, but there was no difference in mean gain between the two groups on measures of word recognition, vocabulary, and spelling. The reading, vocabulary, and spelling measures were scales of the Adult Basic Learning Examination (1968).

While there are several other indirectly related studies in this area, the general conclusion seems apparent that there are few satisfactory data with regard to assessment of the effectiveness of programmed instructional packages for the teaching of reading to functionally illiterate adults.

METHOD

Students

In an attempt to identify functionally illiterate students to be used in this project, 1,163 candidates throughout the United States were administered the Reading Comprehension Section Scale of the Adult Basic Learning Examination (ABLE), Level 2, Form A. Students with raw scores from 10 through 53 on the ABLE were admitted into the program (cf., "Assignment of Students to Programs," p. 20). Of the 1,163 candidates tested (see page 13), 531 started and completed the course of study, as defined on p. 32ff. The number of these students in each field test site is specified in Table 1, along with the dates at which the project was started and completed at each site. As can be seen, an effort was made to sample a number of ethnic groups and all regions of the country (north, east, west, and south).

Tables 2 through 6 present estimates of student characteristics for the total sample and for those at each site.* Thus, it can be observed that there were approximately 303 male and 221 female students in the total sample (Table 2). To preserve anonymity of the test sites, as promised those cooperating with us, site numbers in Tables 2-6 do not correspond with the order of those in Table 1. The numbers of students in various age categories are presented in Table 3 where it can be seen that the modal age was 18 years (120 students),

---

*We will soon turn to the problem of missing data, traditionally a most serious problem in Adult Basic Education research. Missing data on some student characteristics in Tables 2 through 6 explain why the totals do not always equal the number of students who actually completed the project (viz. 531).

and that the second most frequent age category was 25 years (approximately 92 students). The data in Table 4 show that the largest number of students was black (about 271) and the second most frequent category was white (113). The first language spoken by approximately 413 students was English, whereas English was the second language for approximately 93 others (Table 5). The eighth grade was the modal grade completed (176 students), with the second most frequently completed grade being the ninth (93 students), according to the data presented in Table 6.

Selection of Programmed Instructional Reading Materials

The criteria for the selection of the instructional systems were as follows:

1. Only programmed instructional materials were considered. This meant that the materials employed self-instructional procedures so that the students could learn the subject matter with little or no outside help. Furthermore, the materials incorporated a prearranged system requiring the learner to respond actively for each unit (frame) of material. Additionally, the materials provided prompt confirmation or correction for each response the learner made (cf., Joint Committee on Programmed Instruction and Teaching Machines, 1966).

2. The programmed materials were in software form, requiring no hardware as supporting equipment (as mentioned on p. 5).

3. The publisher indicated that the programmed materials were appropriate for an adult population.

4. The materials were applicable to the grade levels that define the functionally illiterate adult, viz., below the eighth grade level and preferably starting well below that grade level.

Table 1. Field Test Sites, Operating Dates, and Numbers of Students

Site	Start	End	Students Tested	Students Completed
Adult Learning Center Raleigh, N. C.	10-26-71	5-28-72	36	22
Correctional Center for Women, Raleigh, N. C.	10-27-71	12- 9-71	40	20
Caledonia Correctional Center, Tillery, N. C.	10-27-71	12- 1-71	44	18
Manpower Development Training Program, Greenville, N. C.	12- 9-71	3- 8-72	32	10
Adult Basic Education Center, Lumberton, N. C.	2- 7-72	5-18-72	48	13
Learning Laboratory, Chattanooga, Tenn.	11- 1-71	4-17-72	40	16
Centinela Valley Adult School, Inglewood, Calif.	11- 9-71	4-28-72	150	64
La Puente Valley Adult School, City of Industry, Calif.	11-10-71	5-12-72	100	60
Meridian Junior College Meridian, Mass.	10-10-71	4-28-72	110	51
Itawamba Junior College Tupelo, Miss.	10- 8-71	3- 1-72	75	23
Knoxville Manpower Training Center, Knoxville, Tenn.	1-27-72	5-19-72	50	16
Beaumont School for Boys, Beaumont, Va.	11-29-71	5-10-72	150	88
State Industrial Farm for Women, Goochland, Va.	11-15-71	3- 1-72	83	60
Onward With Learning Center (OWL), Springfield, Mass.	2- 1-72	5-12-72	90	47
Men's Prison State Farm, Va.	11-29-71	5-15-72	115	23
		Total	1163	531

Table 2. Frequency of Gender of Students by Site

Site Number	Male	Female	Total
1	4	18	22
2	9	41	50
3	60	0	60
4	0	20	20
5	7	16	23
6	18	0	18
7	37	23	60
8	0	23	23
9	29	34	63
10	6	7	13
11	10	0	10
12	27	20	47
13	1	15	16
14	13	3	16
15	82	1	83
Total	303	221	524

Table 3. Frequency of Age Class of Students by Site

Site Number	Age										
	15	18	20	25	30	35	40	45	50	51+	Total
1	0	0	0	7	4	3	2	2	1	3	22
2	0	15	1	1	2	1	4	3	3	14	45
3	0	1	2	19	11	8	5	5	6	3	60
4	0	1	3	3	0	8	2	1	0	1	19
5	1	13	1	0	0	0	1	1	0	0	17
6	0	0	1	9	7	1	0	0	0	0	18
7	0	6	10	15	8	6	2	4	2	4	57
8	0	0	6	9	2	1	5	0	0	0	23
9	1	5	5	10	10	6	4	2	7	9	59
10	0	0	0	1	0	2	0	5	2	3	13
11	0	2	0	8	0	0	0	0	0	0	10
12	0	13	5	3	7	3	5	2	1	6	45
13	0	7	2	3	1	0	0	1	0	1	15
14	0	0	7	4	3	0	2	0	0	0	16
15	21	57	3	0	0	0	0	0	0	0	81
Total	24	120	46	92	55	39	32	26	22	44	500

Table 4. Frequency of Ethnic Groups by Site

Site Number	American Indian	White	Black	Mexican American	Oriental	Puerto Rican	Spanish American	Other	Total
1	0	5	10	0	5	0	0	2	22
2	0	7	39	0	0	0	0	0	46
3	2	9	49	0	0	0	0	0	60
4	1	3	14	0	0	0	1	0	19
5	0	6	17	0	0	0	0	0	23
6	0	4	14	0	0	0	0	0	18
7	0	14	1	18	2	1	16	6	58
8	0	2	21	0	0	0	0	0	23
9	1	13	0	3	8	1	13	25	64
10	2	3	8	0	0	0	0	0	13
11	0	0	10	0	0	0	0	0	10
12	0	14	11	0	0	13	1	5	44
13	0	2	14	0	0	0	0	0	16
14	2	8	6	0	0	0	0	0	16
15	3	23	57	0	0	0	0	0	83
Total	11	113	271	21	15	15	31	38	515

Table 5. Frequency of Primary Language Spoken in Home by Site

Site Number	English	Other	Total
1	15	7	22
2	46	0	46
3	59	0	59
4	20	0	20
5	22	0	22
6	18	0	18
7	32	26	58
8	23	0	23
9	20	44	64
10	13	0	13
11	10	0	10
12	28	16	44
13	16	0	16
14	15	0	15
15	76	0	76
Total	413	93	506

Table 6. Frequency of Grades Completed by Site

Site Number	Highest Grade Completed										Total
	1	2	3	4	5	8	9	10	12	13+	
1	0	0	1	0	1	6	1	3	5	5	22
2	0	1	4	2	5	16	7	3	5	0	43
3	3	2	3	7	7	20	11	9	2	0	59
4	0	0	0	1	1	8	6	3	0	0	19
5	0	1	0	0	0	7	9	2	1	0	20
6	0	0	0	1	0	5	6	2	1	0	15
7	0	2	2	1	2	11	5	8	21	6	58
8	0	0	0	0	1	10	5	5	2	0	23
9	0	0	0	0	4	16	8	6	20	6	60
10	0	0	3	1	1	8	0	0	0	0	13
11	0	0	0	0	0	0	1	1	8	0	10
12	0	1	4	6	2	7	4	2	3	0	29
13	0	0	0	0	0	1	6	4	5	0	16
14	0	0	0	0	0	6	4	2	3	1	16
15	0	0	0	0	0	55	20	4	2	0	81
Total	3	9	17	19	24	176	93	49	78	18	484

An extensive search based on some 20 bibliographies, letters to publishers, and advice of consultants indicated that four appropriate programs were commercially available. They were:

1. Building Your Language Power, by Frank C. Laubach, programmed by William C. Wolf, Jr., published by Silver Burdett Company (1965).

2. Programmed Reading for Adults, by Cynthia Dee Buchanan, published by McGraw-Hill Company (1967).

3. Building Reading Power, by Joseph Loretan and Skelly Umans, published by Charles E. Merrill Books, Inc. (1964).

4. Reading Series, by Maurice W. Sullivan, published by Behavioral Research Laboratories (1969).

After the selection of the above programs, the publishers were again contacted with a request for the entire program, for a statement about the student population for which the program was intended, for any tests available for use with their program, and for any validating data available for the program. These programs were then used in the field test according to instructions specified by the publishers. No validating data for adult populations were received from any of the publishers. Characteristics of these programs are specified under "Results" and appear in Appendix A.

Selection of Field Test Sites

Each of the 50 State Directors of Adult Education was contacted to determine if his state might be interested in cooperating in this research project. Those who indicated an interest were contacted again and final sites were selected according to the willingness and the ability of the site personnel to provide a reasonable number of

students. An effort was also made to select sites that had students with varied ethnic characteristics and to obtain some degree of national sampling (north, south, east, and west). In addition, because of the typically high attrition among ABE students, two prison sites were established near our administrative offices in North Carolina and three in neighboring Virginia. As a result, a total of 15 sites was established in six states: five were in North Carolina, two in California, one in Massachusetts, two in Tennessee, three in Virginia, and two in Mississippi (see Table 1).

Assignment of Students to Programs

The Adult Basic Learning Examination (ABLE) limits for each program group were established by extending two standard deviations above and below the grade levels that were specified by the publisher for each program. This extension allowed an enlargement of the student sample. It should be recognized that there is a lack of comparability of grade levels among ABE materials so that a given grade level does not mean the same thing for different reading programs or for different standardized tests. Furthermore, as is commonly recognized, the concept of "grade level" is inappropriate for adults. The resulting Adult Basic Learning Examination limits according to which students were assigned to programs are presented in Table 7.

A student roster was developed in which the order of the four programs was rotated so that the first student at a given site would be assigned to the first program, the second to the second program, the third to the third program, the fourth on the list to the fourth program, the fifth on the list to the first program, and so forth.

Table 7. Range of Grade Levels and Limits of Adult Basic Learning Examination Raw Scores on the Reading Scale

	Grade Range (from Publishers' Catalogs)	Readability Level (from Civil Service Commission, 1971)	Raw Scores on ABLE Level 2
Programmed Reading for Adults	Up to 6th Grade Level	1.5 - 6.0	35-50
Reading Series	0 to 8th	0.0 - 8.0	10-50
Building Your Language Power	Not Listed	0.0 - 4.1	26-44
Building Reading Power	4.5 or Higher	5.0 - 7.0	38-53

This procedure obviously would have resulted in the random assignment of students to all four conditions. However, it can be seen in Table 7 that the programs have differing ranges of grade levels; consequently, when a student had an Adult Basic Learning Examination reading score that was too low or too high for the program assigned to him, he was reassigned to the program that was necessarily appropriate for him. His first program was then assigned to the next available student on the list. Students who did not score within any of the program ranges were excluded from the reading project. This restriction on ability to randomly assign students to the four program conditions necessarily introduced a confound in the experiment. Furthermore, it later turned out that some sites were unable or unwilling to use all four programs concurrently. Limiting reasons were practical problems; some proctors could not handle four different procedures for the different programs; some sites had so few students that it was impractical to incorporate four different reading programs; at a number of sites few or no students scored on the ABLE in the range of the high and/or low programs (Table 7), so that all four programs could not be assigned at some sites. Such constraints thus dictated that students with differing initial reading levels be assigned to the four programs, and sometimes to fewer than four programs at a given site. The programs used at each site are specified under "Results".

Since it was not possible to randomly assign all students to the four program conditions at any site, the potential for meaningfully comparing the effectiveness of the four programs became limited. Even so, it is more desirable to judge a program by a more absolute criterion.

For instance, it doesn't help much to be able to say that one program is better than another, if all four are poor. The goal, therefore, was to determine the effectiveness of each program when judged in isolation from the others. To accomplish this, as explained later in this report, the strategy followed involved the assessment of each program's effectiveness relative to a large sample of programs which had already been evaluated (cf., McGuigan and Peters, 1965).

Use of Programs

All programs were used as specified in the accompanying publisher-produced manuals or teachers' guides. The class situation, study schedule, etc., varied considerably among sites, depending on local demands and procedures. In some, the student worked at times of his own choosing, while in others, all or only parts of a class worked on their reading programs for the project. The number of meetings per week ranged from 1 to 5, with the majority of the students working two or three times a week, typically for about an hour per meeting. No student studied material designed to teach reading, other than the assigned program, though of course some did study other materials such as arithmetic, English and vocational subjects.

Reading Series employs a series of booklets to be read and coordinated with the books of the program; these were used as specified in the manual. None of the other programs had correlated or supplementary materials that were specified as integral parts of the program.

The students who studied Building Your Language Power and Building Reading Power all started in the first book. For the other

two programs the students started in the book appropriate for them as indicated by the placement examinations.

Measures Taken

Proctors were instructed in detail with regard to data collection procedures, including administration of all tests, the safeguarding of the data, etc. Each site was closely supervised by one member of the project staff. Step-by-step procedures for the proctors during the data collection and study phases are specified in Appendix B. The measures taken were as follows:

1. The Standard Progressive Matrices, a nonverbal measure of intellectual capacity developed by Raven (1960), was administered to each student as an untimed "capacity" test at a convenient time during the project.

2. The Adult Basic Learning Examination (ABLE), a power test developed by Karlsen, Madden and Gardner (1967), was administered as a screening device, and also as a pre- and posttest for a measure of learning. The students were administered the vocabulary, reading and spelling scales of Form A. ABLE Level 2 ranges from below grade 3 to grade 9+. While it obviously would have been desirable to use alternate forms of the Adult Basic Learning Examination, Boyce's (1970) work raised considerable question about the comparability not only of the alternate forms of the Adult Basic Learning Examination but of the two different levels. Other appropriate standardized tests were considered no better in this respect.

3. A Content Test is a curriculum-embedded instrument that samples the specific material presented in each book of a given

program. Content Tests were administered as pretests and posttests immediately before and after studying each book. There were 20 Content Tests for Reading Series, six for Programmed Reading for Adults, 15 for Building Reading Power, and four for Building Your Language Power. Tests furnished by the publisher were used as Content Tests in the case of Programmed Reading for Adults and Reading Series, but had to be developed by project personnel for the programs Building Your Language Power and Building Reading Power (see Appendix C for reliability estimates of the latter two that were staff developed). The Content Tests used for Reading Series were "Progress Tests"; as advised by the publisher, half of each was administered as a posttest when the student completed half of each book and the remainder upon completion of the entire book. Both halves were administered together for a pretest. The Content Tests for Programmed Reading for Adults were "in-book" tests which occur each 24 pages in the program booklets and evaluate the student's achievement on the preceding 24 pages.

For Building Reading Power, application exercises furnished by the publisher were used as the basis for the Content Tests, where they were available.

4. General Reading Test. The General Reading Test was developed as an additional pretest-posttest measure of learning, and also to study the relative performance for each program based on a sample of measures of other programs.* This test consisted of 40 items that were randomly selected from the Content Tests of the four programs.

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*Special thanks to Dr. Edwin Smith of Florida State University and to Dr. William S. Griffith of the University of Chicago for this suggestion.

5. Individual Reading Placement Inventory (IRPI), (Smith and Weldon, 1969). The Oral Paragraph Reading section of this test was administered as a pre- and posttest to a small sample of the students. For this, proctors at four sites were furnished with tape recorders and tapes, and instructed in the administration of Form A of this test (see Appendix D).

6. Slosson Oral Reading Test (Slosson, 1963). The Slosson Oral Reading Test (SORT) is also an individual reading test. However, in this the student pronounces words at increasing levels of difficulty. Administration of the Slosson Oral Reading Test was performed with the same students as for the Individual Reading Placement Inventory (see Appendix D).

7. Program Placement Examinations. Reading Series and Programmed Reading for Adults include placement examinations that indicate where in the program (i.e., at which book number) the student should begin his study. These placement tests were administered as pre- and post-tests.

8. Student Motivation Scale. At the conclusion of all testing, the proctors were asked to rate each student's level of motivation while studying his program. A three-point scale (high, medium, and low motivation) was furnished each instructor for all students.

9. Initial Interview Form. This form was completed by the proctor on the basis of existing student records and on orally furnished information gained from the student prior to his start in the reading program.

10. Student Time Log. Under proctor supervision, students logged their study time and the material covered during each day of their participation in the program.

11. Student Evaluation Form. Student evaluation forms developed by McGuigan and Peters (1965) were slightly modified for the adult population. The details of this questionnaire are presented in the "Results" section.

12. Proctor Evaluation Form. On termination of each site the proctors completed a standard evaluation form developed by McGuigan (1971) for each of the programs used at that site. (See "Results", Tables 54-60.)

Method of Measuring Learning

Amount learned is the primary criterion of the effectiveness of each program (McGuigan and Peters, 1965). The amount of learning resulting from the use of each program was assessed by means of the G statistic, the ratio between the amount learned (gain) to amount that could have been learned (possible gain) as measured by the tests. The equation for computing G is:

$$G = \frac{\text{(mean posttest score)} - \text{(mean pretest score)}}{\text{(possible score)} - \text{(mean pretest score)}} .$$

To compute G we determine:

1) the possible test score, the actual number of points or items on the test.
2) the mean pretest score for the group of students (by averaging the number correct for each student on the pretest).
3) the mean posttest score (the mean number of correct items by the group of students after completion of a given amount of material).

4) the amount learned (gain score) by subtracting the mean pretest score from the mean posttest score, the numerator of the equation for G. The percentage gain is the gain score divided by the mean pretest score (multiplied by 100).

5) the amount of possible learning (the denominator of the G ratio) as measured by a test. This is the possible gain score, viz., the possible score minus the mean pretest score.

G, thus, is a value that normally ranges between 0 and 1 such that the higher the value, the greater the amount learned. (A negative G, incidentally, results when the posttest score is less than the pretest score, probably due to chance fluctuations.) Furthermore, a G of .50 or higher indicates a satisfactory amount of learning (McGuigan and Peters, 1965). A distribution of empirically derived G scores for programmed and nonprogrammed classes is presented in Figure 1.

Among the advantages of G over more primitive measures of amount learned, such as a raw gain score, is that it takes into account the student's level of proficiency prior to his study of the learning system under test. Consider a student who has a very low initial level of proficiency such as that indicated by a pretest score of 25 percent; he has the probability of showing a much larger gain percentage than a student whose pretest score is 90 percent. Hence, by using a simple gain percentage as an index of amount of the learning effectiveness of a program, a negative evaluation of the program could result if students with high pretest scores were used, even if the program were effective. With the G statistic, however, a program may be judged to be effective even with high pretest scores

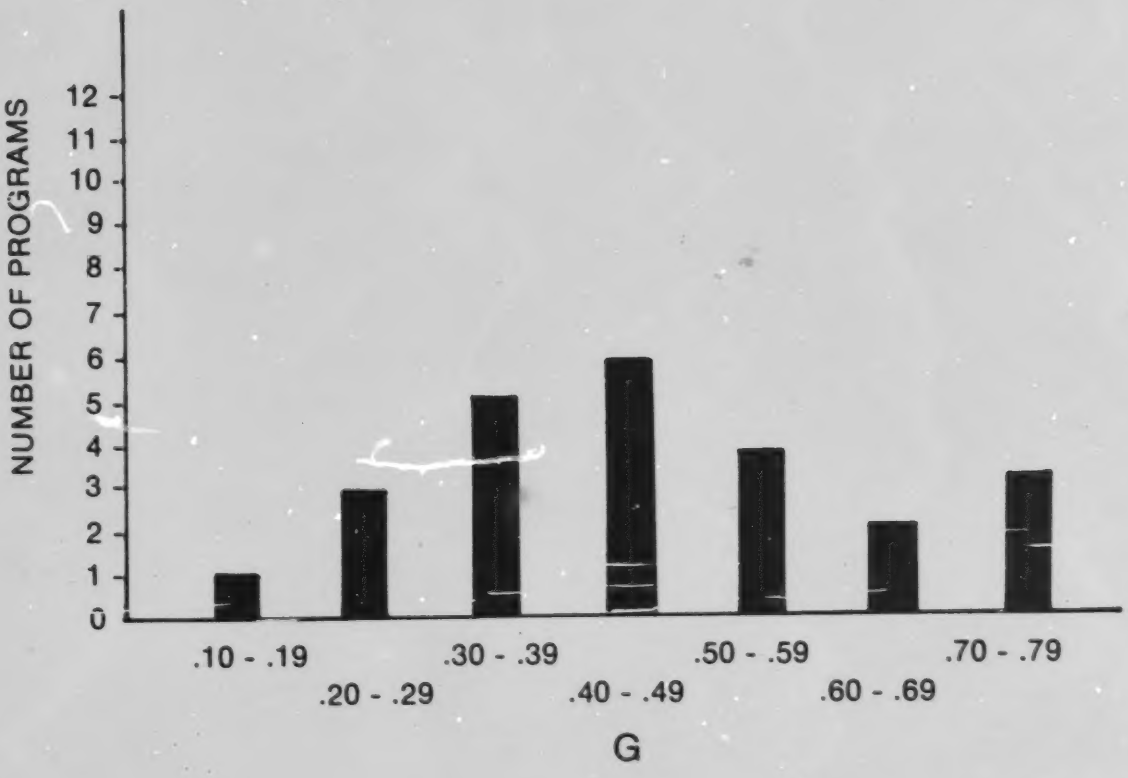

Fig. 1. Frequency distribution of gain-to-possible-gain ratios (G) for 24 different programs.

since the index of effectiveness is amount learned relative to amount that could be learned.* The specific applications of G to the various dependent variable measures will be specified under "Results".

*Note that the higher the pretest score, the higher the value G, viz., the empirical correlation (reported by McGuigan and Peters, 1965) is .14 ($P < .01$).

THE PROBLEM OF MISSING DATA AND ATTRITION

According to the National Center for Educational Statistics (1971), of about 485,000 adults who participated in Adult Basic Education programs during the fiscal year 1969, approximately 172,000 (35 percent) separated during the year for reasons other than having completed the particular program in which they were participating. In a research project, greater demands are placed on the student and, consequently, the attrition can be expected to be even greater than 35 percent. The following are some reasons for attrition: sickness, gaining employment, change in family situations, change in residence, and lack of interest. In addition, testing is relatively frustrating for the functionally illiterate adult, and research testing demands are quite high. Consequently, some students avoid the testing procedure when possible. In the Greenleigh (1966) and Heding et al. (1967) studies cited earlier, the attrition rates were 46 percent and 53 percent. Since attrition is such a major problem in ABE studies, in order to maximize the quantity and quality of data collected, and to reduce student attrition, the plan for this project was to be as flexible as possible with regard to the length of time that the students worked in their programs. Consequently, while every effort was made to keep the students working to complete their entire programs, it was possible for them to be posttested (and included in the data analysis) at any time after the completion of one book. Only 16 students failed to complete the first book in their programs; the attrition rate in this project can thus be considered to be inconsequential. Of the 1,163 candidates who were tested, the Adult Basic

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Learning Examination Scores for 616 did not fall within the limits specified in Table 7. The remainder (531) were the students for this project.

The relevance of attrition is, of course, important to any question of generalization to a population sampled. However, such a question is far too advanced for the present state of ABE methodology, and so is not especially germane here. This is to say that, even if we could adequately define, describe, and enumerate a population of functionally illiterate adults, it would be next to impossible to obtain a representative sample short of dictatorial powers.* For such reasons, with but minor exceptions, techniques for data analysis are limited to those of descriptive statistics in contrast to those of inferential statistics.

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*In this respect, see also Floyd (1972).

PART II

LEARNING RESULTS FOR PROGRAMMED READING FOR ADULTS

RESULTS AND DISCUSSION

Learning Data

As previously stated, the learning criterion is by far the most important for assessing the effectiveness of a program. After analyzing the learning results for each program, the remaining criteria will be discussed.

Learning Results for Programmed Reading for Adults

Content Tests. Programmed Reading for Adults was used at all 15 sites specified in Table 1. In Table 8 are the learning results for each book, based on the content tests. It can be seen, for instance, that 27 individuals who studied Book 3 had a mean pretest score of 83 percent with a range of means over sites from 69 percent to 91 percent. Their mean posttest score was 91 percent (range 85 percent to 100 percent), yielding a mean gain of 8 percent, and a percentage gain of 10 percent (see pages 27 to 30 for the method of computing these statistics). The mean G ratio of .46 was significantly different from zero, and the range of G values over sites was .34 to 1.00. The G ratios for Books 3 and 4 approach the criterion of .50, suggesting that the individuals who studied this program may (within sampling fluctuations) have learned a satisfactory amount from these particular books. The amount learned from the other four books seems, by the content test measure, rather low, viz. G values of .30, .07, .25 and .28.

Table 8. Learning Data for Programmed Reading for Adults Based on Six Content Tests (Percentages)*

Book Number	N	Pretest $\bar{X}$	Range of Means	Posttest $\bar{X}$	Range of Means	$\bar{X}$ Gain and % Gain	Mean G	Range of G
3	27	83%	69-91	91%	85-100	8(10%)	.46**	.34-1.00
4	42	88%	75-98	91%	88- 98	3(3%)	.46**	.15-0.63
5	61	88%	65-98	91%	62- 98	3(4%)	.30**	.00-0.74
6	55	89%	85-98	90%	75- 97	1(0%)	.07	.00-0.41
7	69	93%	88-98	94%	87- 99	1(2%)	.25**	.25-0.90
8	75	96%	86-99	97%	96-100	1(%)	.28**	.13-1.00
Total	329	$\bar{X}$=91**	---	$\bar{X}$=93**	---	2(2%)	.22	---

*Values based on one subject or negative G values are not included in ranges.

**$P < .05$.

It may be noted that the students generally had quite high pretest scores--based on 329 scores, summed at the bottom of Table 8; the mean pretest score over all six books was 91. The mean posttest score over books was 93, the gain was 2, the percentage gain shown in parentheses was 2 percent, and the overall $\underline{G}$ was .22.

The results in Table 9 present the $\underline{G}$ and gain percentages as a function of intelligence level. More particularly, students were classified according to whether their scores fell in Raven's (1960, p. 11) category II ("definitely above the average in intellectual capacity"--above the 75th percentile), category III ("intellectually average," a score between the 25th and 75th percentiles), or category IV ("definitely below average in intellectual capacity," i.e., below the 25th percentile). It may be noted, for instance, that 10 students with Standard Progressive Matrices scores which placed them in the low intelligence category had a percentage gain of 14 percent and a $\underline{G}$ value of .45. Their $\underline{G}$ ratios for Books 4, 5, 6, 7, and 8 were .18, .25, .09, .23, and .39, respectively. These $\underline{G}$ values for individual books were weighted by the corresponding number of students (n), summed and divided by the total number of students (N) to provide a mean weighted $\underline{G}$ over books. That is, a composite $\underline{G}$ was computed according to the equation:

$$\text{Composite } \underline{G} = \frac{\underline{G}_1(n_1) + \underline{G}_2(n_2) + \ldots \underline{G}_k(n_k)}{N} .$$

In this case:

$$\text{Composite } \underline{G} = \frac{.45(10) + .18(14) + .25(26) + .09(24) + .23(27) + .39(31)}{132}$$

$$= \frac{33.98}{132} = .26.$$

Table 9. G Ratios and Percent Gain on Content Tests for Programmed Reading for Adults as a Function of Intelligence

Intelligence		Book Number						Composite G
		3	4	5	6	7	8	
LOW	G	.45*	.18	.25	.09	.23	.39	.26
	n	10	14	26	24	27	31	
	% Gain	14	2	5	1	2	2	
MEDIUM	G	.70*	.60*	.45*	.20	.32	.23	.38
	n	8	11	16	16	20	18	
	% Gain	8	9	5	1	1	0	
HIGH	G	1.00	.60	.66	.87	.12	1.00*	.65
	n	1	3	2	2	6	7	
	% Gain	2	8	8	9	0	1	

*$P < .05$.

This composite G for the low intelligence individuals of .26 is presented in Table 9, as are those for the medium and high intelligence categories (viz., .38 and .65). One should cautiously interpret these results, though, since the number falling in the high intelligence category is relatively small.

The results for this sample suggest that intelligence (as measured by the Standard Progressive Matrices) is positively related to amount learned through the study of Programmed Reading for Adults. More particularly, while those of low and medium intelligence did not appear to learn a substantial amount, those classified in the high intelligence category apparently profited substantially from studying the program.

As with intelligence, motivation of the students seemed to be positively related to the amount learned (Table 10). Even so, while the highly motivated individuals appear to have learned more (composite G = .41) than the individuals with low motivation (composite G = .09) even those classified as high in motivation only approached the criterion that indicates a satisfactory amount of learning, viz., G = .50. With regard to individual books, it is interesting to note in Table 10 that three of the six books were successful for the highly motivated students, while only two of 12 possible books were successful for the other students (viz., Books 3 and 5).

In Table 11 can be studied amount learned according to whether or not English was the first language of the student. The composite G over books for those who had English as their first language was .30, while for the other students the composite G was .18. With the possible exception of Book 3, this variable does not differentiate the

Table 10. G Ratios and Percent Gain on Content Tests for Programmed Reading for Adults as a Function of Motivation

Motivation		Book Number						Composite G
		3	4	5	6	7	8	
LOW	G	.60	.42	.13	-.64	.33	0	.09
	n	5	4	7	7	9	12	
	% Gain	12	6	3	7	1	0	
MEDIUM	G	.29	.43*	.52*	.17	.35*	.25	.34
	n	9	18	19	21	26	26	
	% Gain	7	9	13	2	3	0	
HIGH	G	.87	-.09	.25	.42	.53*	.56	.41
	n	4	10	18	1	19	23	
	% Gain	14	0	4	4	2	2	

*$P < .05$.

Table 11. G Ratios and Percent Gain on Content Tests for Programmed Reading for Adults as a Function of First Language

First Language		Book Number						Composite G
		3	4	5	6	7	8	
ENGLISH	G	.55*	.40	.28*	.10	.32*	.31	.30
	n	17	23	42	40	59	67	
	% Gain	11	6	5	1	2	1	
OTHER	G	.31*	.16	.35*	0	.04	.17	.18
	n	10	19	19	15	10	8	
	% Gain	6	2	7	0	0	1	

*$p < .05$.

students on a learning criterion. Neither do the learning results for each book presented for the various ethnic groups in Table 12 indicate any substantial difference in composite G scores among the various groups.

Placement Test. The placement examination available for Programmed Reading for Adults was, as specified under "Method", also included in the pretest/posttest battery. The function of the placement examination, per the publisher, is to start the student at the level appropriate for him in the program. One student, for instance, might need to start at Book 3, whereas a more advanced student would start higher in the program, perhaps at Book 6.

The learning results are summarized in a matrix in Table 13. There it should be noted that the book number in which the student started is on the vertical axis of the matrix, whereas the last book completed is on the horizontal axis. It can be observed that one student started in Book 3 but went no farther; this student had a percentage gain of 25 percent and a G of 1.0.

Since the placement test is graduated, the values of G in Table 13 were computed on the basis of the maximum score specified for the last book in the series completed by each student. This is to say that the placement series examination contains a total of 50 items. The first 10 of these items sample the material through Book 3, the next 10 items sample through Book 4 and so on. Hence, G was computed using 10 points as the possible score for the student who studied through Book 3, and 20 points for those who went through Book 4. The possible score through each book is indicated within parentheses at the top of each column of Table 13, e.g., the five

Table 12. G Ratios and Percent Gain on Content Tests for Programmed Reading for Adults as a Function of Ethnic Classification

Ethnic Classification		Book Number						Composite G
		3	4	5	6	7	8	
WHITE	G	.54*	.23	.11	-.03	.20	.60	.26
	n	3	6	11	11	16	15	
	% Gain	36	5	2	0	2	2	
BLACK	G	.50	.38	.29	.10	.39	.25	.29
	n	10	12	26	28	40	48	
	% Gain	8	3	4	1	2	0	
SPANISH SPEAKING	G	.56*	.44	.36	-.07	-.05	.13	.28
	n	11	17	12	10	7	7	
	% Gain	7	7	7	1	0	1	
OTHER	G	.10	-.12	.42	.31	.41	-.33	.19
	n	3	7	12	6	6	5	
	% Gain	3	1	10	6	3	0	

*$P < .05$.

Table 13. G Ratios and Percent Gain on Placement Tests for Programmed Reading for Adults

Beginning Book Number		Termination Book Number and Possible Score						Composite G
		3(10)	4(20)	5(30)	6(40)	7(50)	8(50)	
	G	1.00	.57*	.67*	.54	-.12	.50*	.50
3	n	1	5	6	2	3	7	
	% Gain	25	13	64	38	7	21	
	G		.31	.56*	.25	.30	.75	.50
4	n		7	6	1	1	5	
	% Gain		5	15	2	7	20	
	G			-.33	.83	71	.63*	.55
5	n			2	1	3	13	
	% Gain			3	14	18	11	
	G				.28	0	.26	.20
6	n				2	2	4	
	% Gain				2	0	4	
	G					.33	.16	.17
7	n					1	27	
	% Gain					2	1	
	G						.04	.04
8	n						11	
	% Gain						0	

*P < .05.

subjects who started in Book 3 and ended in Book 4 who had a gain of 13 percent and the G value of .57 had that G value based on a maximum possible score of 20.

The data in Table 13 in the top row show that, in general, those students who started in Book 3 all learned a rather substantial amount as indicated by their high G values (an exception is for the three students who ended in Book 7 and had a G = -.12), e.g., those seven who started in Book 3 and ended in Book 8 have a relatively high G value of .50. The composite G for these students who started in Book 3 is .50.

Similarly, it can be seen that those students who started in Book 4 and in Book 5 generally learned a satisfactory amount, as indicated by their composite G scores of .50 and .55 respectively. In contrast, those students who started in Books 6, 7, and 8 generally had depressed G scores.

It appears, then, that those students who had the most complete exposure to the program learned considerably more per book. Stated differently, there is apparently a cumulative effect such that the amount of learning for each book is greater when the series of six books have been studied than when fewer, more advanced books have been studied. Note that this statement takes into account the graduated ceiling on the placement tests. It may be concluded that, within these limits, Programmed Reading for Adults led to a sufficient amount of learning, as measured by the Placement Test, providing the students start no later than Book 5.

General Reading Test. In Table 14 are the learning data obtained from the use of the General Reading Test. Again, the

Table 14. G Ratios and Percent Gain on General Reading Test for Programmed Reading for Adults

Beginning Book Number		Termination Book Number 3	4	5	6	7	8	Composite G
	G	.15	.18	.22	.30	.10	.07	.16
3	n	2	7	7	3	4	9	
	% Gain	4	7	13	35	3	3	
	G		.03	.07	.54	.17	.29	.14
4	n		8	7	1	1	6	
	% Gain		1	2	68	20	12	
	G			.18	-.10	.10	.33	.22
5	n			4	4	5	18	
	% Gain			5	- 0	3	8	
	G				.04	.00	.29	.15
6	n				4	2	5	
	% Gain				0	0	10	
	G					.00	18	.17
7	n					2	31	
	% Gain					0	3	
	G						-.02	-.03
8	n						15	
	% Gain						- 0	

results are arranged in a matrix according to start and completion books of the program. It can be seen that two students started in Book 3 and completed their study in Book 3 with a mean G value of .15. Seven other students started in Book 3 and ended in Book 4 with G = .18. All students who started in Book 3, regardless of which was their last book of study, had a composite G of .16. A survey of the entire matrix shows that, with the exception of one student who had a G of .54, the G values resulting from the General Reading Test measure are, in general, exceedingly low.

It should be remembered that the General Reading Test was composed of items randomly selected from the content tests of all four programs. In Table 15 are presented the mean percentages of correct items from the content tests for each program as a function of the program studied by the students. For instance, data here are available on 110 students who studied Programmed Reading for Adults. The mean score for these students was 92 percent correct on items from the Programmed Reading for Adults content test, 77 percent from the content test for Building Your Language Power, 78 percent for Reading Series and 43 percent from Building Reading Power. In essence, then, measured learning for the Programmed Reading for Adults was greatest by the Programmed Reading for Adults items themselves, as would be expected. A smaller amount of learning was measured by the criteria for Building Your Language Power and Reading Series, while the least amount of learning occurred by the measure for Building Reading Power. It is interesting to note that approximately the same pattern holds for the other three programs, i.e., regardless of which program was studied, the highest scores were obtained on the

Table 15. Mean Posttest Scores on the General Reading Test by Component Parts and by Program

Program	Component			
	Programmed Reading for Adults	Building Your Language Power	Reading	Building Reading Power
Programmed Reading for Adults (N=110)	92%	77%	78%	43%
Building Your Language Power (N=43)	90%	82%	80%	45%
Reading Series (N=108)	87%	70%	76%	39%
Building Reading Power (N=118)	95%	84%	90%	75%

Programmed Reading for Adults components of the General Reading Test. Similarly, the least amount of learning was always measured by the sample of items for Building Reading Power. Preliminary data of these kind should be of value in future studies of transfer among programs and of the relative difficulty of criterial tests.

Adult Basic Learning Examination. Results for the Reading, Spelling, and Vocabulary scales of the Adult Basic Learning Examination were analyzed separately, and the results are presented in Tables 16, 17, and 18. The various G values, based on the maximum possible score for the tests of 58 for Reading, 50 for Vocabulary, and 40 for Spelling may all be seen to be extremely low. This result is not particularly surprising since it is typical to find low learning scores for a program when the measure is a standardized test such as the Adult Basic Learning Examination (cf., McCuigan, 1967). One obvious reason for this is that items are contained in the test that are not covered in the program (and vice versa), so that standardized tests are generally not highly valid as criterial measures of programs. This is particularly true when the program does not purport to include material all the way up to the ceiling of the test. Hence, the low G scores in Tables 16, 17, and 18 are quite understandable, though it is apparent that whatever is taught by the program is not measured by the Reading, Vocabulary, and Spelling scales of the Adult Basic Learning Examination.

SORI and IRPI. In Table 19 are summarized the results for the two individually administered oral tests (see Appendix D for administration and analysis procedures). Nineteen students were administered the SORI, their mean pretest level was the 5.21 grade and their mean posttest level was 5.20 grade. The

Table 16. G Ratios and Percent Gain on ABLE II Reading Test for Programmed Reading for Adults

Beginning Book Number		Termination Book Number 4	5	6	7	8	Composite G
	G	.18	.08	-.04	-.16	.04	.04
3	n	4	3	2	7	8	
	% Gain	13	5	- 2	- 14	3	
	G			-.19	-.21	.22	.08
4	n			1	1	4	
	% Gain			- 15	- 28	12	
	G		.60	.12	.14	.31*	.28
5	n		1	1	5	14	
	% Gain		5	4	6	16	
	G			.15	0	.24	.16
6	n			1	1	2	
	% Gain			12	0	1	
	G					.11	.11
7	n					26	
	% Gain					3	
	G					.14*	.14
8	n					13	
	% Gain					3	

*P < .05.

Table 17. G Ratios and Percent Gain on ABLE II Vocabulary Test for Programmed Reading for Adults

Beginning Book Number		Termination Book Number						Composite G
		3	4	5	6	7	8	
	G		.27	-.10	.22		.02	.05
3	n		2	3	1		6	
	% Gain	2	21	8	36		2	
	G				.24	.02	.03	.08
4	n				1	1	2	
	% Gain				24	7	1	
	G			.37		-.18	.14	-.00
5	n			2		4	10	
	% Gain			13		11	17	
	G				-.23	.13	0	-.02
6	n				1	1	2	
	% Gain				17	10	0	
	G					-.10	.02	.02
7	n					1	25	
	% Gain					6	1	
	G						.03	.04
8	n						10	
	% Gain						1	

Table 18. G Ratios and Percent Gain on ABLE II Spelling Test for Programmed Reading for Adults

Beginning Book Number		Termination Book Number 4	5	6	7	8	Composite G
3	G	-.03	.01	.00	.00	.04	.02
	n	1	2	1	1	6	
	% Gain	14	0	0	0	111	
4	G			0	.02	-.02	-.01
	n			1	1	2	
	% Gain			0		2	
5	G		.01		.17	.12*	.12
	n		2		4	.10	
	% Gain		50		.31	31	
6	G			.02	-.07	.00	-.01
	n			1	1	2	
	% Gain			.00	3	0	
7	G					.04*	.04
	n					24	
	% Gain					20	
8	G					.00	.00
	n					10	
	% Gain					1	

*P < .05.

Table 19. Learning Results on Two Individual Oral Tests (the SORT and the IRPI) for Programmed Reading for Adults

Measure	n	Mean Pretest	Mean Posttest	Mean Gain (%)	G
SORT	19	5.21 grade	5.20 grade	- .01(0%)	.00
IRPI Frustration Level	17	491.2	547.10	55.9 (11%)	.19
Correct Oral Words (%)	16	96.85	96.82	- .03(0%)	-.01

mean gain was -.01 and the percentage gain was 0 percent. The possible score (the test ceiling) is grade 10, so the resulting G is 0.00.

Two mean scores were computed for the IRPI. The first was "The Frustration Level," defined as the number of words in the paragraphs that could be read until the students could not make out any additional words. It can be seen that the students on the average could read 491.2 words before studying their program and that they could read an average of 547.10 words on the posttest. The mean gain was 55.9, and the percentage gain was 11 percent. The possible score was 778, the number of words in the text, so that the resulting G was .19. The number of errors made in reading up to the frustration level was counted, and a percentage of errors was computed. This error value was subtracted from 100 percent, so that the percentage of words correctly read was calculated and entered in Table 19. The students read a mean of 96.85 percent of the 491.2 words correctly on the pretest, and the percentage of correct words on the posttest was 96.82 percent. The mean gain was -.03, with a percentage gain of 0 percent. The possible score is, obviously, 100 percent, a percentage based on the number of words that were read to reach the frustration level. The resulting G was -.01. Clearly, these measures do not indicate any noticeable amount of learning on the part of the students.

Conclusion for Learning Results

The placement test indicated that a satisfactory amount of learning resulted from the use of this program. Similarly, the high

intelligence students also learned a substantial amount. In contrast, an insufficient amount of learning was indicated by the other measures.

PART III

LEARNING RESULTS FOR BUILDING READING POWER

Learning Results for Building Reading Power

Content Tests. This program was used at all sites except #10. The results of the content tests for Building Reading Power are summarized in Table 20 where, by surveying the mean G values for each book, the general conclusion can be reached that the individuals who used this program did not, on the average, learn a sizable amount, i.e., these G values are quite low with none of them exceeding the standard of .50. For instance, the 130 students who started in Book 1 had a mean pretest score for Book 1 of 80, and a mean posttest score of 89; this yields a G value of .44, the highest for any of the books in the program. The mean pretest percentage over the 15 books, based on 1421 scores, was 75 percent. While this is somewhat high prior to studying the program, examination of some of the values in Table 20 suggests that it was still possible for G to have shown sufficient learning, e.g., the mean pretest score for Book 4 was 40 percent and the G value was .11. However, as indicated in the "Range" column, the mean posttest score at one site was as high as 76 percent, indicating that students with the low pretest score had the good possibility of yielding a high G value for this book had they but advanced from their pretest score of 40 percent to the 76 percent achieved by others. In a similar manner, the highest pretest score was for Book 13, viz., 94 percent (40 percent was the lowest), the gain for Book 13 was 2 percent, and the G was .31. Hence, students with the highest pretest score had a noticeably higher G than those with the lowest pretest score (see footnote on p. 30).

Table 20. Learning Data for Building Reading Power Based on Fifteen Content Tests (Percentages)*

Book Number	n	Mean Pretest	Range of Means	Mean Posttest	Range of Means	Mean Gain (%)	G	Range of G
1	130	80	67- 96	89	70- 98	9 (11%)	.44**	0.00-0.90
2	116	81	73- 90	84	73- 92	3 (4%)	.17**	0.00-0.52
3	118	61	32- 76	69	43- 84	8 (13%)	.20**	0.03-0.36
4	117	40	23- 80	47	20- 76	7 (17%)	.11**	0.00-0.33
5	102	74	62- 92	74	51- 91	0 (0%)	.02	0.00-0.14
6	98	83	68- 93	86	76- 96	3 (4%)	.20**	0.00-0.75
7	99	74	57- 90	78	65- 88	4 (4%)	.13**	0.00-0.37
8	91	93	83- 98	95	83-100	2 (2%)	.32**	0.00-0.87
9	84	76	60- 92	82	64- 88	6 (8%)	.27**	0.00-0.60
10	78	83	67- 93	86	70- 95	3 (3%)	.15**	0.10-0.60
11	83	66	50- 88	74	55- 90	8 (12%)	.24**	0.00-0.57
12	79	80	65-100	87	73-100	7 (8%)	.35**	0.00-0.75
13	81	94	88-100	96	90-100	2 (1%)	.31**	0.00-1.00
14	74	75	38- 88	77	44- 97	2 (1%)	.05	0.00-0.80
15	71	86	73-100	89	84-100	3 (3%)	.21	0.00-1.00
Total	1421	$\bar{X}$=75**		$\bar{X}$=80**		5 (6%)	.25	

*Values based on one subject or negative G values are not included in ranges.

**P < .05.

While there were several relatively high G values for books at some sites, the overall evaluation by the content test criterion must be essentially negative. This conclusion is strengthened by noting that no composite G computed for any site approached .50--there was no particular site that was consistently high over books for this program on this learning criterion. An occasionally high G score at one of many sites is probably due to chance fluctuations or to the effects of other variables not being analyzed.

The relationship between intelligence and learning, as measured by the content tests, may be studied in Table 21. While there were relatively few students in the high intelligence category, they did yield, on the average, relatively high G values (composite G = .56), noticeably higher than for the medium and low intelligence groups. This suggests that students who fall into the relatively high intelligence category can learn a satisfactory amount from the use of Building Reading Power, but those in the medium and low intelligence categories do not.

Composite G scores for this program did not appear to systematically vary with motivation (Table 22); they all are, furthermore, quite low.

Similarly, whether or not English was the first language does not appear to be a relevant variable for Building Reading Power since the composite G scores over books was .22 for the "English" category, and .24 for those with English as a second language (Table 23).

There is some variation in the composite G scores as a function of ethnic group, though any general interpretations would necessarily be quite tenuous, particularly in view of the relatively small numbers

Table 21. G Ratios and Percent Gain on Content Tests for Building Reading Power as a Function of Intelligence

Intelligence		Book Number														Composite
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	G
	G	.38*	.17	.21*	.11*	.03	.24*	.07	.15	.29*	.19	.28*	.37	.15	.01	.20
LOW	n	44	44	41	41	34	37	38	32	30	26	29	28	26	27	
	% Gain	8	4	14	23	1	5	2	1	12	5	19	11	0	0	
	G	.47*	.16	.16*	.13*	.05	.10	.17	.15	.17	.15	.20	.29	.47	.07	.19
MEDIUM	n	39	36	38	40	37	36	33	30	36	33	35	33	35	31	
	% Gain	13	3	10	17	1	1	5	0	4	3	11	5	2	2	
	G	.77*	.66	.67	.30	.05	.16	.53	1.00	.75	.25	.75	1.00	1.00	.33	.56
HIGH	n	10	7	8	8	8	8	7	7	6	7	7	7	7	7	
	% Gain	17	16	31	31	1	1	7	6	21	1	9	6	0	4	

*P < .05.

Table 22 G Ratios and Percent Gain on Content Tests for Building Reading Power as a Function of Motivation

Motivation		Book Number															Composite G
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
LOW	G	.66*	.12	.20*	06	0	.31	.17	.40	.42	.17	.08	.37	.33	.08	.25	.25
	n	25	22	21	19	19	16	13	12	10	10	10	9	9	7	7	
	% Gain	15	2	11	7	0	8	10	1	14	6	8	20	2	6	3	
MEDIUM	G	.45*	.26*	.19*	.14*	.01	.10	.08	.42	.31	.12	.51*	.46	.45	.14	.14	.25
	n	40	37	34	33	33	31	31	27	28	25	27	26	27	25	25	
	% Gain	15	6	15	30	0	1	3	2	9	3	31	11	3	5	5	
HIGH	G	.48*	.25	.19*	.14*	.03	.07	.11	.41*	.26*	.18	.17	.23	.05	.02	.38	.21
	n	43	39	43	44	36	38	41	39	34	33	34	33	32	30	29	
	% Gain	12	6	10	17	1	1	2	3	7	2	6	4	0	0	6	

*P < .05.

Table 23. G Ratios and Percent Gain on Content Tests for Building Reading Power as a Function of First Language

First Language		Book Number 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Composite G
ENGLISH	G	.45*	.19*	.20*	.11*	.03	.20*	.13	.3*	.29*	.15	.24*	.31*	.29*	.04	.20	.22
	n	117	105	106	107	93	92	90	82	77	71	77	72	73	67	64	
	% Gain	12	4	12	17	1	4	4	9	10	3	13	8	1	1	3	
OTHER	G	.33	0	.20	.19	.07	.25	.13	.40	-.11	.27	.20	.80	.50	.22	.50	.24
	n	13	11	12	10	9	6	9	9	7	7	6	7	8	7	7	
	% Gain	5	0	19	17	1	3	5	6	2	3	4	13	3	4	3	

*$P < .05$.

of students for the Spanish-speaking category and for the "other" category (Table 24).

General Reading Test. In Table 25 are learning results measured by the General Reading Test for students who started in Book 1 and ended in various of the 15 books of the program. The cell of most interest is the last, for it contains 61 students who started in Book 1 and completed all 15 books of the program. These students had a gain percentage of 4 and a G value of .24. Thus the composite G values in Table 24 and the composite G for all students of .21 (close to that of .24) indicate that by the General Reading Test criterion the students did not learn a satisfactory amount from using Building Reading Power.

Adult Basic Learning Examination (Level 2) Results

The learning results based on this measure are consistent with those above derived from the other tests, viz., as can be seen in Table 26 there are indications here, too, of relatively low amounts of learning. It can be noted in Table 26 that the composite G values over the 15 books for students who started in Book 1 and ended in Book 15 is .20 on the Reading scale, .10 on the Vocabulary scale, and .12 on the Spelling scale, all relatively low values.

SORT and IRPI

The results on the SORT and the IRPI are summarized for Building Reading Power in Table 27. Clearly the results for the SORT and the percentage of words read correctly on the IRPI do not indicate a sufficient amount of learning. However, the number of words read to reach the frustration level on the IRPI was a measure that did yield

Table 24 G Ratios and Percent Gain on Content Tests for Building Reading Power as a Function of Ethnic Classification

Ethnic Classification		Book Number															Composite G
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
WHITE	G	.07	.12	.20*	.14	0	.17	-.07	.52	.31*	.17	.15	.12	.33	.20	.45	.18
	n	34	29	31	32	23	26	27	24	19	17	20	17	18	17	15	
	% Gain	1	1	17	30	0	23	1	4	10	3	7	1	0	4	7	
BLACK	G	.57*	.20*	.22*	.08*	.03*	.23*	.19*	.23*	.31*	.14	.29*	.36*	.25	.01	.14	.23
	n	77	72	69	70	64	61	57	54	54	50	53	51	51	46	45	
	% Gain	18	0	2	12	1	5	8	1	10	2	17	10	1	0	2	
SPANISH-SPEAKING	G	.22	0	.01	.12	.07	0	.04	.35	-.09	.22	-.16	.55	.40	0	.20	.13
	n	8	7	8	8	8	5	8	8	7	7	6	7	8	7	7	
	% Gain	6	0	2	17	1	0	2	7	4	4	4	19	2	0	3	
OTHER	G	.40	.13	.34*	.34*	.05*	.22	.25		.25	.20	.20	0	1.00	.66	0	.29
	n	11	8	10	7	7	6	7		4	4	4	4	4	4	4	
	% Gain	4	2	31	21	1	3	5		1	6	6	0	6	6	0	

*P < .05.

Table 25. G Ratios and Percent Gain on General Reading Test for Building Reading Power for Students Who Began in Book 1

	Termination Book Number															Composite G
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
G	-.03	.09	.42	.26	.39	.10	.18	.17		-.33	.47	.18	-.25		.24*	.21
n	3	5	10	9	14	3	7	24	0	4	3	2	5	0	61	
% Gain	-1	1	1	1	3	0	4	1		-3	7	8	-2		4	

*P < .05.

Table 26. G Ratios and Percent Gain on ABLE II for Building Reading Power for Students Who Began in Book 1

ABLE Scale		Termination Book Number													Composite G
		1	2	3	4	5	6	7	8	10	11	12	13	15	
READING	G	.12	.20	.14	.07	.21	.35	-.04	.30*	.36	-.35	-.64	-.17	.22*	.20
	n	3	3	4	4	9	2	6	16	4	3	2	5	54	
	% Gain	3	5	3	1	3	11	-1	8	6	9	-8	2	4	
VOCAB-ULARY	G	.21	-.10	-.10	.25	-.03	.20	-.03	.09	-.07	-.11	-.62	.10	.18*	.10
	n	3	3	4	4	6	2	6	15	3	3	1	4	42	
	% Gain	9	6	5	22	1	5	1	4	1	3	11	6	9	
SPELL-ING	G	.08	.01	.18	.03	.20	.20	.25	.10*	.15	.02	.14	.29	.09	.12
	n	3	3	4	3	6	2	6	15	3	3	1	4	41	
	% Gain	128	15	100	8	36	57	83	15	30	6	83	60	12	

*$P < .05$.

Table 27. Learning Results on Two Individual Oral Tests (the SORT and the IRPI) for Building Reading Power

Measure	n	Mean Pretest	Mean Posttest	Mean Gain (%)	G
SORT	10	7.20 grade	7.28 grade	.08(1%)	.03
IRPI Frustration Level	10	748.90	762.50	13.60(2%)	.47
Correct Oral Words (%)	10	98.36	98.47	.11(0%)	.07

a relatively high G score of .47, though this still did not reach the acceptable level of .50. It is particularly interesting to note the high pretest level for this high G.

Conclusion for Learning Results

The general conclusion based on these various measures is that an inadequate amount of learning resulted from the use of Building Reading Power.

PART IV

LEARNING RESULTS FOR READING SERIES

Learning Results for Reading Series

Content Tests. Reading Series was used at all sites except #10, 11, and 14. In Table 28 are the learning results over sites for each of the 20 books of Reading Series. A survey of the G values indicates that they are typically rather low, the composite G over books being .31. The highest G value (.49) resulted for Book 1. A study of the components of this G of .49 suggests that while a number of students did seem to learn a satisfactory amount from Book 1 (at site #2 one student had a G value of 1.0, at site #3 the mean for 9 students was .61, at site #9 the mean of 10 students was .53, etc.) there were considerably more sites with G values below .50. The results of the content tests thus indicate that, on the average, the students did not learn a substantial amount from the use of Reading Series.

Amount learned as measured by the content tests does not appear to systematically increase with intelligence (Table 29) or motivation (Table 30). This is in contrast to some positive relationships with regard to these variables previously discussed for other programs. Nor do any composite G values in Tables 29 and 30 exceed .50; hence, the program is not sufficiently effective for either high intelligence or high motivation students.

In like manner, it does not appear that the amount of learning is substantially different as a function of whether or not English was the first language (Table 31), or as a function of ethnic classification (Table 32). There is a hint in Table 32 that Reading Series does not work as well for Spanish speaking individuals as for the

Table 28. Learning Data for Reading Series Based on Twenty Content Tests (Percentages)*

Book Number	n	Mean Pretest	Range of Means	Mean Posttest	Range of Means	Mean Gain (%)	G	Range of G
1	47	87	82-92	93	91- 96	6(7%)	.49**	.30-0.61
2	60	87	79-93	91	87- 99	4(4%)	.28**	.14-0.93
3	53	84	75-89	88	81- 96	4(4%)	.25**	.09-0.82
4	56	86	76-94	89	83- 97	3(4%)	.26**	.13-0.50
5	62	91	81-94	93	86- 98	2(2%)	.28**	.24-0.71
6	64	90	80-94	93	87- 98	3(3%)	.29**	.06-0.68
7	62	88	82-94	93	87- 98	5(5%)	.40**	.17-0.67
8	53	89	82-96	93	85- 99	4(4%)	.33**	.12-0.83
9	41	85	78-92	88	80- 94	3(2%)	.15**	.09-0.54
10	39	87	73-94	90	81- 94	3(3%)	.25**	.00-0.55
11	38	85	72-92	91	79- 99	6(6%)	.38**	.24-0.90
12	32	88	74-95	92	84- 99	4(4%)	.32**	.15-0.75
13	25	84	72-95	87	70-100	3(3%)	.16	.00-1.00
14	24	83	66-96	89	68- 99	6(6%)	.33	.04-0.67
15	18	92	86-99	95	90-100	3(3%)	.42**	.27-1.00
16	19	78	38-92	81	48- 92	3(5%)	.17**	.00-0.16
17	19	73	63-99	82	76- 99	9(11%)	.32	.00-0.36
18	19	75	64-91	84	77- 99	9(12%)	.38	.28-0.86
19	14	85	78-91	91	90- 95	6(8%)	.44	.48-0.55
20	12	87	82-88	92	89- 93	5(5%)	.37	.18-0.45
Total	757	$\bar{X}$=86		$\bar{X}$=90		4(5%)	.28	

*Values based on one subject or negative G values are not included in ranges.

**$P < .05$.

Table 29. G Ratios and Percent Gain on Content Tests for Reading Series as a Function of Intelligence

Intelligence		Book Number																				Composite G
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	G	.49	-.03	.19*	.04	.16	.16	.34*	.37*	.16	.28*	.31*	.31	.21	.36*	.31	.09	.28	.40*	.43*	.32*	.26
LOW	n	10	11	12	17	19	23	22	20	18	19	18	14	13	13	12	13	13	13	11	9	
	% Gain	10	0	5	1	1	1	4	4	3	3	4	4	4	9	3	3	9	11	5	3	
	G	.59*	.52*	.39*	.42*	.48	.52*	.52*	.46*	.13	.20	.36	.35	.50	.73	.75	.45	.48	.65	.57	.84	.46
MEDIUM	n	15	21	21	20	20	19	17	14	9	7	6	6	3	3	1	2	2	2	1	1	
	% Gain	5	7	7	6	4	7	9	5	1	3	5	5	8	13	8	7	69	43	52	40	
	G	.50	.42	.31	.13	.36	.38	.59*	.42	.25	-.09	.50	.52	0	-.18	.60	.88	.86	.15			.36
HIGH	n	4	10	7	8	8	7	7	7	6	3	5	6	4	4	3	2	2	2			
	% Gain	1	2	3	1	2	3	6	4	3	0	8	5	0	1	2	11	2	5			

* $P < .05$.

Table 30. G Ratios and Percent Gain on Content Tests for Reading Series as a Function of Motivation

Motivation		Book Number																				Composite G
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	G	.39	.33*	.50	.57	.64	.20	.53	.37	-.66	.33	.40	-.25						1.00	-.66	.57	.39
LOW	n	3	5	5	5	4	3	4	2	1	2	2	1						1	1	1	
	% Gain	9	8	5	11	7	0	5	4	5	2	5	2						25	5	12	
	G	.61*	.19	.20*	.24	.49*	.17	.17	32	.20	.26	.44	.20	.43	.25	.21	-.09	.41	.22	.51	.21	.29
MEDIUM	n	12	13	16	14	22	21	18	14	7	10	10	7	7	7	5	6	7	7	5	4	
	% Gain	11	3	4	4	5	1	1	2	2	3	4	1	5	1	1	2	15	5	9	2	
	G	.59*	.44*	.38*	.20	.09	.42*	.34*	.42*	.18	.21	.49*	.32	.19	.01	.66*	.33*	.30	.49	.41	.38	.34
HIGH	n	15	23	17	19	19	25	24	24	17	16	16	14	11	10	7	7	5	5	3	3	
	% Gain	7	4	7	3	0	5	4	5	2	2	7	3	4	0	3	13	11	17	6	4	

* $P < .05$.

Table 31. $\underline{G}$ Ratios and Percent Gain on Content Tests for Reading Series as a Function of First Language

First Language		Book Number																			Composite $\underline{G}$
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
ENGLISH	$\underline{G}$	.46*	.30*	.27*	.17	.30*	.34*	.43*	.40*	.11	.29*	.36*	.25*	.22*	.27*	.42*	.18*	.35*	.35*	.44*	.44	.32
	n	38	46	42	42	47	52	50	43	36	35	33	28	22	22	16	16	16	16	12	10	
	% Gain	6	4	5	2	2	3	5	4	1	4	5	3	3	5	3	6	14	12	8	6	
OTHER	$\underline{G}$	.57*	.21	.15	.47*	.22	.02	.28*	.17	.30	-.10	.47	.68	-.10	.78	.42	.06	.09	.53	.40	.07	.27
	n	9	14	11	14	15	12	12	10	5	4	5	4	3	2	2	3	3	3	2	2	
	% Gain	12	3	2	9	3	0	4	3	7	1	11	12	3	24	4	1	2	14	5	1	

* $P < .05$.

Table 32. G Ratios and Percent Gain on Content Tests for Reading Series as a Function of Ethnic Classification

Ethnic Classification		Book Number																				Composite G
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
WHITE	G	.51*	.12	.03	.29*	.23	.54*	.42*	.37*	.17*	.54*	.35*	.46	.06	.33	.50*	.26*	.39	.41	.56	.76	.33
	n	12	15	13	12	13	14	16	12	8	6	6	7	7	7	6	5	4	3	2	2	
	% Gain	6	1	0	4	1	6	5	5	2	9	7	6	1	15	7	16	25	41	25	20	
BLACK	G	.45*	.40*	.46*	.25*	.31	.23	.51*	.41*	.15	.26	.45*	.22*	.38*	.28	.31	.06	.33	.30	.37	.28	.33
	n	17	24	23	24	29	35	29	25	22	23	21	16	13	13	10	10	11	12	9	8	
	% Gain	5	6	7	4	3	2	6	4	2	3	5	2	5	3	1	1	11	7	5	3	
SPANISH SPEAKING	G	.28	.20	.17	.13	0	.09	.19	.16	-.03	.02	.24	.28	-.07	.50	.42	0	0	.42	.50	0	.16
	n	7	10	6	8	8	7	10	11	6	7	7	6	2	2	1	1	1	1	1	1	
	% Gain	4	3	4	3	0	1	3	2	1	0	6	8	1	19	9	0	0	38	16	0	
OTHER	G	.61*	.21	.15	.37	.47	.24	.24	.36	.44	.20	.46	.57	-.04	.25	1.00	.62	.28	.66*	.33	.20	.36
	n	11	11	13	12	12	8	7	5	5	3	6	3	3	2	1	3	3	3	2	1	
	% Gain	14	3	2	4	4	2	2	5	6	2	7	7	1	1	0	4	3	9	1	2	

* $P < .05$.

other ethnic classifications, but one must note the relatively small number of students in the "Spanish" category, particularly after Book 12.

Placement Examination Results. Relatively low G values are indicated (Table 33) for the placement test for Reading Series. These G values were computed on the basis of the maximum score for the last book completed for each student, as specified on page 44. These maximum scores are entered within parentheses for each book in Table 33. For example, several students started in Book 1 and ended in each book through Book 12; their G values vary between 0 and .55. The composite G for all these students who started in Book 1, regardless of where they stopped, was .36.

The results were somewhat more positive for the very few students who started in Book 2 and ended in each book from 3 through 9; their G values varied between .20 and .85, and their composite G was .48, a reasonably high value. The composite G scores in the last column of Table 33 computed for every other book in which students started never exceeded .50. These results are generally consistent with those from the content tests in that they suggest that while some learning did occur, it was not, by established standards, a relatively high amount.

The General Reading Test. The results for General Reading Test, summarized in Table 34, indicate that the G values are, in general, relatively low. Twenty additional students started in Book 16 and ended in Book 20; they had a percentage gain of 5 percent and a G of .30. The conclusion is thus consonant with those based on the content and placement tests that a substantial amount of learning did not, in general, result from the use of Reading Series.

Adult Basic Learning Examination. The G values are generally low for all three scales (Table 35) of the Adult Basic Learning

Table 33. G Ratios and Percent Gain on Placement Test for Reading Series

Beginning Book Number		Termination Book Number and Possible Score																			Composite G
		1(4)	2(8)	3(12)	4(16)	5(20)	6(24)	7(31)	8(35)	9(39)	10(43)	11(47)	12(51)	13(55)	14(59)	15(63)	16(67)	17(71)	18(75)	19(79)	20(83)	
1	G	.50	.02	.55*	0	.16	.28*	.38*	.45	.41	.55	.42	.17	.37		.59		.21	.65			.36
	n	2	4	6	1	2	4	3	3	3	2	1	2	1		1		1	1			
	% Gain	150	5	145	0	13	26	31	20	34	66	34	21	29		44		7	23			
2	G			.85	.54*	.40	.56	.35	.20	.73		.14					-.10					.48
	n			2	6	3	2	1	2	2		1					1					
	% Gain			35	42	13	28	42	11	56		2					27					
3	G			0		-.12			.09	.62												.09
	n			1		2			2	1												
	% Gain			0		3			4	43												
4	G				.66	0	.50				.81	.66	.44		.45							.44
	n				1	2	1				1	1	1		1							
	% Gain				15	0	25				48	22	9		29							
5	G					0	-.60		.40			.16	0		.50	.33			.47		.39*	.23
	n					1	1		2			1	3		2	1			1		4	
	% Gain					0	15		3			2	0		11	16			21		16	
6	G							-.15	.55	.25	.40			.72								.23
	n							4	1	1	1			2								
	% Gain							2	19	2	5			46								

* $P < .05$.

Table 34. G Ratios and Percent on the General Reading Test for Reading Series

Beginning Book Number		Termination Book Number																			Composite G
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	G	1.00	.05	.06	.17	.15	-.04	.22	.23	.23	.15	.00	.17	1.00	.58	.23	.31	.54	.13			.19
1	n	2	7	8	4	4	6	4	5	5	2	1	4	1	1	2	1	1	3			
	% Gain	0	3	2	15	6	-1	14	15	10	17	0	15	0	22	5	33	18	4			
	G					-.04	.21	1.00	.17	-.08	.44	.45					.14				.00	.29
2	n					3	3	1	2	2	1	1					1				1	
	% Gain					-0	4	0	19	-3	32	15					26				0	
	G			1.00	1.00	.10			1.00	1.00												.78
3	n			2	1	2			2	1												
	% Gain			0	0	3			0	0												
	G				1.00	.12	.00			.06	1.00	.23	1.00		1.00						-.36	.33
4	n				1	3	1			1	1	1	1		1						2	
	% Gain				0	5	0			3	0	10	0		0						-5	
	G					.18	1.00	1.00	.00		.29	.33	.30		.45	.14			.27		.02	.29
5	n					1	1	1	2		2	1	3		3	2			1		4	
	% Gain					6	0	0	0		7	2	13		4	2			9		0	
	G							.44	.04	.14	.00			.26	1.00					.28		.29
7	n							4	2	1	2			2	1					1		
	% Gain							7	1	2	0			14	0					13		

Table 35. G Ratios and Percent Gain on ABLE II for Reading Series

ABLE Scale		Termination Book Number																	Composite
		1	2	3	4	5	6	7	8	9	10	11	12	13	15	16	17	18	G
READING	G	.08	.11	.16	06	.15	-.53	-.24	.51	-.16	-.20	-.08	.17	.17	.33	72	.50	.19	.08
	n	2	3	6	3	1	4	1	3	3	1	1	3	1	1	1	1	2	
	% Gain	21	34	42	9	12	35	18	41	10	30	2	11	17	1	17	26	15	
SPELLING	G	0	-.01	.02	0	.02	0	0	0	0	.02	.05	0		0		0	.25	-.02
	n	1	2	4	1	2	3	2	3	3	1	1	2		1		1	1	
	% Gain		-1	19			8		0	-50			0		0		0	38	
VOCABULARY	G	.18	.07	.45	.08	-.12	.39	.24	09	.03	.20	.00	.25	.18	28	.08	0	.12	19
	n	2	3	5	1	2	4	2	3	3	2	1	2	1	1	1	1	1	
	% Gain	27	12	41	18	-15	34	8	12	4	16	0	4	53	4	20	0	21	

Examination, a conclusion in line with the Adult Basic Learning Examination results for the other programs. In particular, no composite G value based on more than one student ever approached .50.

SORT and IRPI. The results for the SORT and IRPI are summarized in Table 36. The G values are all quite low indicating an insufficient amount of learning by these measures.

Conclusion for Learning Results

The general conclusion for Reading Series is that, by all measures, an insufficient amount of learning resulted from the use of the program.

Table 36. Learning Results on Two Individual Oral Tests (the SORT and the IRPI) for Reading Series

Measure	n	Mean Pretest	Mean Posttest	Mean Gain (%)	G
SORT	10	6.30 grade	6.15 grade	- .15(2%)	.04
IRPI Frustration Level	8	676.30	691.63	15.33(2%)	.15
Correct Oral Words (%)	8	97.64	98.14	.50(0%)	.21

PART V

LEARNING RESULTS FOR BUILDING YOUR LANGUAGE POWER

Learning Results for Building Your Language Power

Building Your Language Power was used in site numbers 1, 3, 4, 5, 6, 7, 8, and 15. In Table 37 are presented the results for Building Your Language Power as measured by the content tests. It can be seen, for instance, that 49 people studied Book 3, that their mean pretest score was 86 percent, and that the lowest pretest score at any of the sites was 77 percent while the highest was 92 percent. The mean posttest score over all sites was 88 percent, with a range of 80 percent to 92 percent. The mean gain from 86 percent to 88 percent can be seen to be 2, a percentage gain over the mean pretest score of 3 percent. The G ratio was .19, a value significantly different from 0. The range of G values was .00 to a high of .50 (.50 was based on but three students at one site).

As before, a set of means is presented at the bottom of Table 37. They do convey useful summary information. Based on 157 scores, these are somewhat fictitious since they are not independent measures (i.e., most subjects went through all four books). It can be observed that the mean pretest score over sites and over books was 72 percent; the mean posttest score was 78 percent, yielding a mean gain of 6 (8 percent) and an overall G value of .20. A detailed study of the low-gain scores, and particularly of the low G scores of Table 37, indicates that a relatively small amount of learning occurred through using Building Your Language Power, as measured by the content tests.

We next turn to the question of whether or not this program is more effective for students with certain characteristics than for students with

Table 37. Learning Data for Building Your Language Power Based on Content Tests (Percentages)*

Book Number	n	Mean Pretest	Range of Means	Mean Posttest	Range of Means	Mean Gain and % Gain	Mean G	Range G
3	49	86	77-92	88	80-92	2(2%)	.19**	.00-.50
4	48	72	52-96	80	64-88	8(11%)	.29**	.04-.46
5	32	63	41-82	70	47-77	7(10%)	.18**	.00-.33
6	28	60	52-66	64	52-81	4(7%)	.10	.03-.29
Total	157	$\bar{X}$=72		$\bar{X}$=78		6(8%)	.20	

*Values based on one subject or negative G values are not included in ranges.

**$P < .05$.

other characteristics. Learning results as a function of intelligence are presented in Table 38 where it can be noted that most students in this sample fell into the lowest intelligence category. Those classified as highest in intelligence showed the greatest amount of learning ($\underline{G}$ = .44), though they still did not satisfy the standard of .50.

In Table 39 are learning results for students classified according to whether they had low, medium or high degrees of motivation. For Book 3, 13 students had a $\underline{G}$ score of .13 and a gain percentage of 2 percent. The composite $\underline{G}$ for the low motivation students for all four books was .16. Even though it is apparent that the highest $\underline{G}$ score resulted for those classified as highly motivated (viz., .34) even the highly motivated students did not evidence a satisfactory amount of learning.

In Table 40 are learning results as a function of ethnic classification. The students were classified as White, Black, Spanish-speaking (Puerto Rican, Mexican, Spanish-American) and "other" (Oriental and American Indian). The composite $\underline{G}$ values give a hint that Building Your Language Power was relatively more effective for the Spanish-speaking and "other" categories, though none of the composite $\underline{G}$ scores are exceptionally high.

In Table 41 is evidence that students who had English as their primary language apparently learned less than did students who had another language (almost exclusively Spanish) as their first language. That is, English as a second language students yielded a composite $\underline{G}$ score of .40 relative to .14.

Table 38. G Ratios and Percent Gain on Content Tests for Building Your Language Power as a Function of Intelligence

Intelligence		Book Number 3	4	5	6	Composite G
LOW	G	.11	.28*	.08	.12	.16
	n	22	23	16	14	
	% Gain	2	13	5	10	
MEDIUM	G	.05	.32*	.13	0	.14
	n	13	13	8	8	
	% Gain	0	14	6	0	
HIGH	G	.47	.48*	.55*	.18	.44
	n	7	7	6	5	
	% Gain	6	8	27	8	

*$P < .05$.

Table 39. G Ratios and Percent Gain on Content Tests for Building Your Language Power as a Function of Motivation

Motivation		Book Number 3	4	5	6	Composite G
LOW	G	.13	.30*	.02	.09	.16
	n	13	13	9	7	
	% Gain	2	17	2	7	
MEDIUM	G	.06	.22	0	.03	.11
	n	17	15	6	6	
	% Gain	1	10	0	2	
HIGH	G	.38*	.39*	.38*	.14	.34
	n	17	18	16	15	
	% Gain	6	10	21	8	

*P < .05.

Table 40. G Ratios and Percent Gain on Content Tests for Building Your Language Power as a Function of Ethnic Classification

Ethnic Classification		Book Number 3	4	5	6	Composite G
	G	.26	.20	.02	.17	.18
WHITE	n	9	7	7	4	
	% Gain	4	7	1	9	
	G	.08	.26*	.08	.01	.14
BLACK	n	28	29	13	13	
	% Gain	1	13	6	1	
	G	.37	.50	.48*	.13	.38
SPANISH SPEAKING	n	8	8	8	7	
	% Gain	5	9	22	5	
	G	.50	.63	.30*	.32	.44
OTHER	n	4	4	4	4	
	% Gain	6	14	15	25	

*$P < .05$.

Table 41. G Ratios and Percent Gain on Content Tests for Building Your Language Power as a Function of First Language

First Language		Book Number 3	4	5	6	Composite G
ENGLISH	G	.12	.25*	.06	.04	.14
	n	37	36	20	17	
	% Gain	2	12	4	3	
OTHER	G	.41	.55*	.42*	.21*	.40
	n	12	12	12	11	
	% Gain	6	11	20	12	

*$P < .05$.

General Reading Test Results. The results for the students who were pre- and posttested on the General Reading Test are presented in Table 42. All students reported on started in Book 3 and ended in Books 3, 4, 5, or 6. With the exception of the one student who worked only Book 3, the amount learned as measured by this test was quite small, i.e., the G values are all low for the individual cells of Table 42, yielding a composite G of .19.

Results on the Adult Basic Learning Examination Level 2. The results on the Reading, Vocabulary and Spelling scales for students who started in Book 3 and ended in Books 3, 4, 5, or 6 are presented in Table 43. Quite clearly these G values are all low, indicating that little learning took place, according to this measure.

The results for the SORT and IRPI are summarized in Table 44. It should be noted that the G values are all quite low, indicating an insufficient amount of learning by these measures. The general conclusion, consonant with all measures, is that an inadequate amount of learning results from the use of this program.

Conclusion for Learning Results

All measures are consistent in indicating that, by a learning criterion, Building Your Language Power is an ineffective program.

Table 42. G Ratios and Percent Gain on General Reading Test for Building Your Language Power

Beginning Book Number		Termination Book Number 3	4	5	6	Composite G
3	G	.59	.09	.19*	.23*	.19
	n	1	16	5	28	
	% Gain	61	2	7	8	

*P < .05.

Table 43. G Ratios and Percent Gain on ABLE II for Building Your Language Power for Students Who Began in Book 3

ABLE Scale		Termination Book Number 3	4	5	6	Composite G
	G	-.05	.14	.17	.05	.09
READING	n	1	11	3	19	
	% Gain	-2	8	14	3	
	G	.13	.12	.09	.02	.06
VOCABULARY	n	1	9	2	16	
	% Gain	19	12	4	2	
	G	.05	-.04	.03	.03	.01
SPELLING	n	1	9	2	16	
	% Gain	66	-28		16	

Table 44. Learning Results on Two Individual Oral Tests (the SORT and the IRPI) for Building Your Language Power

Measure	n	Mean Pretest	Mean Posttest	Mean Gain (%)	G
SORT	10	3.04 grade	3.54 grade	.50(16%)	.07
IRPI Frustration Level	6	393.50	463.8	70.30(18%)	.18
Correct Oral Words (%)	6	97.88	97.45	-.43(0%)	-.20

PART VI

INTERCORRELATIONS AMONG VARIABLES

Intercorrelations between Dependent Variable Scores

Before summarizing and interpreting the findings discussed to this point, it may be helpful to examine the relationships between the dependent variable measures. Pearson Product Moment Correlations between each dependent variable measure for learning and each other taken pair-wise (on the posttest) are presented in Table 45. Each correlation value was based on the number of students who used both tests, as specified within the parentheses (hence the varying numbers of students for the different correlations). For example, 81 students took both the Programmed Reading for Adults content tests and the General Reading Test; the resulting correlation was .59, ($p < .05$).

Of particular note, the content test for Programmed Reading for Adults correlated significantly with all possible tests, viz., the General Reading Test, the three scales of the Adult Basic Learning Examination, and the placement test for Programmed Reading for Adults (this correlation value is not in the matrix of Table 45 but, with 78 students the correlation was .85, $p < .05$). A similar finding occurs for the Programmed Reading for Adults placement test, with the exception that the correlation of .21 with the Vocabulary scale of the Adult Basic Learning Examination just misses being significant.

Surprisingly, the Reading Series content tests do not correlate significantly with the Reading Series placement test, viz., with 76 students the correlation was only .13. The Reading Series content tests do, though, correlate significantly and quite highly with the General Reading Test, and also with the Vocabulary and Reading scales of the Adult Basic Learning Examination. The Reading Series placement test, however, does not significantly correlate with any of the other

Table 45. Intercorrelations of the Dependent Variable Measures on the Posttest (Number of Scores Used for Each Correlation Is Shown in Parentheses)

	General Reading Test	ABLE Vocabulary	ABLE Reading	ABLE Spelling
Programmed Reading for Adults Content Test	.59* (81)	.23* (69)	.62* (83)	.27* (69)
Programmed Reading for Adults Placement Test	.61* (70)	.21 (65)	.61* (71)	.36* (65)
Building Your Language Power Content Test	.37* (34)	.25 (33)	.46* (35)	.00 (33)
Reading Series Content Test	.60* (80)	.31* (79)	.28* (86)	.18 (64)
Reading Series Placement Test	.23 (66)	.20 (81)	.18 (82)	.15 (70)
Building Reading Power Content Test	.42* (115)	.15 (110)	.30* (122)	.07 (108)
General Reading Test		.38* (272)	.69* (292)	.49* (265)
ABLE Vocabulary			.41* (312)	.20* (301)
ABLE Reading				.44* (298)

*P < .05.

measures, making one wonder about its validity. The General Reading Test very interestingly correlates significantly with all scales of the Adult Basic Learning Examination, viz., .38, .69, and .49 (Table 45). In our rudimentary stage of ABE research it is reassuring to note that, with the exception of the Reading Series Placement Test, there are significant correlations between the other measures of reading.

PART VII

STUDENT AND PROCTOR EVALUATIONS

Student Evaluations

The results from the 7 item Student Evaluation Form for each of the four programs are summarized in Tables 46 through 52. Presented are the relative frequencies, entered as percentages, with which students checked each point on the several scales. For example, according to the data in Table 46, 74 percent of the 113 who studied Programmed Reading for Adults indicated that they "learned more" "because programmed instruction was used in this course." Twenty percent of those 113 students indicated that they believed "it made no difference," while 6 percent were relatively negative, indicating that they had "learned less" because programmed instruction was used in the course. The results for the other three programs can be similarly studied and compared with normative data for 33 other programs that have been empirically tested by McGuigan and Peters (1965). Relative to these normative data, the present students thought they learned more by using programmed instruction, regardless of which test programs they studied.

There was a tendency, slight though it may be, for the present students to believe that they learned much more by using programmed instruction than by studying regular textbooks (Table 47). In Table 47 there is a noticeable percentage who apparently believe they learn much more from books, as indicated by the percentages all exceeding the standard of 10 percent for that column. However there appears to be less of a preference for those who studied the test programs to take another course using programmed material than for the norm group (Table 48). The data in Table 49 indicate that those students who studied Programmed Reading for Adults and Reading Series thought they "learned

Table 46. Mean Student Reaction by Program to the Question: "Because Programmed Instruction Was Used in This Course, I Believe:"

Program	n	I Learned More	It Made No Difference	I Learned Less
33 Programs	1525	68%	19%	13%
Programmed Reading for Adults	113	74%	20%	6%
Building Your Language Power	39	90%	10%	0%
Reading Series	91	88%	11%	1%
Building Reading Power	113	85%	12%	3%

Table 47. Mean Student Reaction by Program to the Question: "In Comparing Work Done Using Programmed Instruction with Studying in Regular Textbooks, I Feel That with the Same Amount of Time and Effort:"

Program	n	I Learned Much More with P.I.	I Learned Somewhat More with P.I.	There Is No Difference	I Learned Somewhat More from Studying Textbooks	I Learned Much More from Studying Textbooks
33 Programs	1524	28%	39%	8%	15%	10%
Programmed Reading for Adults	113	34%	20%	18%	10%	18%
Building Your Language Power	38	37%	34%	5%	5%	19%
Reading Series	91	34%	23%	15%	11%	17%
Building Reading Power	110	35%	31%	5%	14%	15%

Table 48. Mean Student Reaction by Program to the Question: "If I Were to Take Another Course in This Subject, I Would:"

Program	n	Like to Have P.I. Used for at Least Part of the Course	Like P.I. As Well As Anything Else	Like to Have Something Other Than P.I. Used
33 Programs	1521	64%	14%	22%
Programmed Reading for Adults	114	38%	35%	27%
Building Your Language Power	39	39%	38%	23%
Reading Series	89	37%	39%	24%
Building Reading Power	112	40%	42%	18%

Table 49. Mean Student Reaction to the Question: "How Much Do You Think You Learned from This Program?"

Program	n	Learned Nothing	Learned a Little	Learned a Medium Amount	Learned Quite a Bit	Learned Very Much
33 Programs	1526	2%	15%	32%	34%	17%
Programmed Reading for Adults	114	7%	18%	10%	29%	36%
Building Your Language Power	39	0%	26%	15%	41%	18%
Reading Series	91	2%	11%	21%	25%	41%
Building Reading Power	113	3%	13%	22%	42%	20%

very much" relative to the norm students, i.e., 17 percent of the norm students who previously had studied 33 programs checked "learned very much" whereas 36 percent and 41 percent checked this category for Programmed Reading for Adults and Reading Series; the ratings are less positive for Building Your Language Power (18 percent) and for Building Reading Power (20 percent). Again, relative to the norm group, all four programs were evaluated rather positively on an enjoyment criterion, viz. the percentage checking "very enjoyable" in Table 50 was noticeably higher for all programs than the standard of 17 percent. The relatively high value of 10 percent under "very unenjoyable" occurs for Building Your Language Power.

Programmed instruction is sometimes considered to be excessively repetitious, because repetition is intentionally built into programs. Nevertheless, the agile programmer can reduce boredom, and the amount of perceived repetition is an important criterion. The data in Table 51 indicate that all programs more or less approximated percentages for the five categories of the norm group, though Building Your Language Power had the somewhat high percentage of 14 percent for "much too much" repetition.

The ratingsof the written evaluations are overwhelmingly positive for all four programs (Table 52).

A summary of the student reactions is presented in Table 53. This summary was based on percentage of positive evaluations on each item relative to the norm group. For example, 68 percent of the norm group checked "I learned more" on the first item (Table 46), whereas all four test programs had higher percentages for that category (viz., 74 percent, 90 percent, 88 percent and 85 percent); consequently,

Table 50. Mean Student Reaction to the Question: "How Much Did You Enjoy Going Through This Program?"

Program	n	Very Unenjoyable	Unenjoyable	50-50	Enjoyable	Very Enjoyable
33 Programs	1526	3%	11%	41%	28%	17%
Programmed Reading for Adults	113	2%	8%	30%	26%	34%
Building Your Language Power	39	10%	0%	18%	36%	36%
Reading Series	91	2%	8%	22%	31%	37%
Building Reading Power	113	6%	7%	30%	32%	25%

Table 51. Mean Student Reaction to the Question: "How Much Did the Program Repeat Itself?"

Program	n	Much Too Much	Too Much	Some	A Little	Not at All
33 Programs	1518	7%	17%	41%	27%	8%
Programmed Reading for Adults	115	9%	18%	36%	28%	9%
Building Your Language Power	37	14%	16%	43%	16%	11%
Reading Series	90	7%	11%	39%	30%	13%
Building Reading Power	113	11%	10%	49%	26%	4%

Table 52. Mean Student Reaction to the Question: "In Your Own Words Say What You Thought of the Program. For Example, What Did You Like About the Program? What Did You Dislike about It? Any Other Thoughts?" (Reaction Was Summarized as Positive or Negative)

Program	n	Positive	Negative
Programmed Reading for Adults	92	83%	17%
Building Your Language Power	31	87%	13%
Reading Series	59	90%	10%
Building Reading Power	97	88%	12%

Table 53. Summary of Student Reactions

Program	Table Number 46	47	48	49*	50*	51	52*
Programmed Reading for Adults	+	-	-	+	+	+	+
Building Your Language Power	+	+	-	+	+	-	+
Reading Series	+	-	-	+	+	+	+
Building Reading Power	+	-	-	+	+	-	+

four pluses are entered in the summary table under Table 46. In evaluating these comparisons, it should be taken into account that only a minority of the comparison group consisted of adults, and those were typically literate. Consequently these comparisons are tenuous, and again point up the need for basic normative data for ABE research. Within such limitations, though, and placing heavy emphasis on the three most important items (those indicated by asterisks), it appears that the students who used all four programs generally evaluated them on the positive side, relative to the normative data.

The results of the proctor evaluations of the programs are summarized in Tables 54 through 60. We can see in Table 54, for instance, that of 13 proctors who used Programmed Reading for Adults, 11 thought that the subject matter was academically sound, while two were undecided. It is thus apparent that all programs were considered generally sound by the proctors and that they generally considered the level of the subject matter appropriate for their subjects, though there is somewhat of a tendency for a few to regard each program as being too easy (Table 55).

How effective did they consider the programs? Programmed Reading for Adults was considered quite effective or equally effective with other materials by the large majority of the proctors who worked with that program (Table 56). Reading Series was similarly evaluated in a positive manner. None of the sixteen proctors who used Building Reading Power considered it a great deal more effective than most other materials, though four considered it a little more effective. There is somewhat of a tendency to regard Building Reading Power

Table 54. Proctor Reaction by Program to the Question: "Is the Subject Matter of the Program Academically Sound?"

Program	N	Yes	No	Undecided
Programmed Reading for Adults	13	11	0	2
Building Your Language Power	8	7	1	0
Reading Series	12	11	1	0
Building Reading Power	16	14	0	2

Table 55. Proctor Reaction by Program to the Question: "Was the Level of the Subject Matter Appropriate for Your Learners?"

Program	N	Too Difficult	Appropriate	Too Easy
Programmed Reading for Adults	13	1	9	3
Building Your Language Power	7	1	5	1
Reading Series	12	0	10	2
Building Reading Power	12	0	10	2

Table 56. Proctor Reaction by Program to the Question: "As Contrasted with What You Have Been Able to Accomplish with Other Types of Learning Material, How Much Do You Feel You Were Able to Get Your Students to Learn with This Program?"

Program	N	A Great Deal More Than Most Other Materials	A Little More Than with Most Other Materials	About as Much as with Other Materials	A Little Less Than with Most Other Materials	So Little as to Be a Waste of Time
Programmed Reading for Adults	13	2	2	7	1	1
Building Your Language Power	8	0	0	4	3	1
Reading Series	12	3	4	3	1	1
Building Reading Power	16	0	4	6	3	3

Table 57. Proctor Reaction by Program to the Question: "The Next Time You Conduct a Course in This Subject or a Similar Field, Would You:"

Program	N	Prefer to Have Programmed Instruction Used for at Least Part of the Course	Prefer Not to Have Programmed Instruction Used	Not Care Whether Programmed Instruction Is Used or Not
Programmed Reading for Adults	11	11	0	0
Building Your Language Power	7	6	0	1
Reading Series	11	11	0	0
Building Reading Power	14	13	0	1

Table 58. Proctor Reaction by Program to the Question: "To What Extent Did You Enjoy Using This Program with Your Learners?"

Program	N	Very Unenjoyable	Unenjoyable	50-50	Enjoyable	Very Enjoyable
Programmed Reading for Adults	11	0	0	3	6	2
Building Your Learning Power	8	2	2	3	0	1
Reading Series	11	1	1	2	4	3
Building Reading Power	14	0	2	6	4	2

Table 59. Proctor Reaction by Program to the Question: "Do You Think This Program Should Be Available for the Use of Teachers throughout the Country?"

Program	N	Yes	No	Don't Know
Programmed Reading for Adults	11	10	0	1
Building Your Language Power	7	1	4	2
Reading Series	11	10	1	0
Building Reading Power	14	8	1	5

Table 60. Summary of Proctor Reactions

Program	Table Number 54*	55	56*	57	58*	59**
Programmed Reading for Adults	+	+	+	+	+	+
Building Your Language Power	+	+	-	+	-	-
Reading Series	+	+	+	+	+	+
Building Reading Power	+	+	-	+	+	+

negatively, with six proctors registering themselves on the negative side of the scale. Building Your Language Power was even more negatively evaluated on the average with 50 percent of the eight proctors regarding it as less effective than other materials and 50 percent as about as effective.

With but two exceptions out of 43, the proctors were overwhelmingly positively inclined to use programmed instruction again (Table 57). And, as can be observed in Table 58, those who used Programmed Reading for Adults, Reading Series, and Building Reading Power enjoyed using the materials with their students. The obvious exception is with Building Your Language Power, which was registered as "unenjoyable" or "very unenjoyable" by 50 percent of the 8 proctors. Their opinion too was that those three programs should be made available for the use of teachers throughout the country, the clear exception being, again, Building Your Language Power (Table 59).

These results for proctor evaluations are summarized in Table 60. It seems apparent that the proctors, in general, favorably evaluated Programmed Reading for Adults, Reading Series, and Building Reading Power, but the general reaction to Building Your Language Power was negative.

Study Time

Analysis of the study log sheets allowed the computation of mean study time per book and per program. In Table 61 can be noted the total study time for each program and also the mean study time for each book. Reading Series, which consists of 20 books, had the longest study time, viz. 78.20 hours, an average of 3.91 hours per book.

Table 61. Average Study Time in Hours per Program Book by Program

Program	Average Book Time	Average Program Time	Number Books
Programmed Reading for Adults	4.68	29.16	6
Building Your Language Power	5.62	21.04	4
Reading Series	3.91	78.20	20
Building Reading Power	1.06	15.40	15

Error Analysis

One of the standard principles of programming is that error rates for the frames should be low (the reason being to maximize reinforcement). By ascertaining the error rates for the components and for the entire program, a judgment of the quality of those components and of the entire program can be made. Estimates of the mean error rates were obtained from a random sub-sample of programs from the entire sample of 531. The results are presented for the four programs in Tables 62 to 65. For example, according to the data in Table 62, the mean error rate for Book 3 for Programmed Reading for Adults was 4.5 percent, based on six students. The mean error rate for all six books based on 20 students was 3.9 percent. A distribution of error rates for a variety of programs previously evaluated (McGuigan and Peters, 1965) appears in Figure 2, allowing judgments to be made of the values in Tables 62 through 65 with those of the distribution. For instance, the mean error rate of 3.9 percent for Programmed Reading for Adults appears to be relatively low suggesting that, by an error rate criterion, Programmed Reading for Adults is a successful program. Furthermore, the mean error rates are consistently low for all books.

In contrast, the mean total error rate of 10.9 percent for Building Your Language Power is excessively high, as it is for each individual book (Table 63). According to Table 64, the mean error rate for Reading Series is 6.6 percent which, while not excessive, is somewhat high. The problem lies with particular books, such as Book 11 with an error rate of 9.1 percent, Book 7 with an error rate of 10.3 percent, and Books 6 and 5 with error rates of

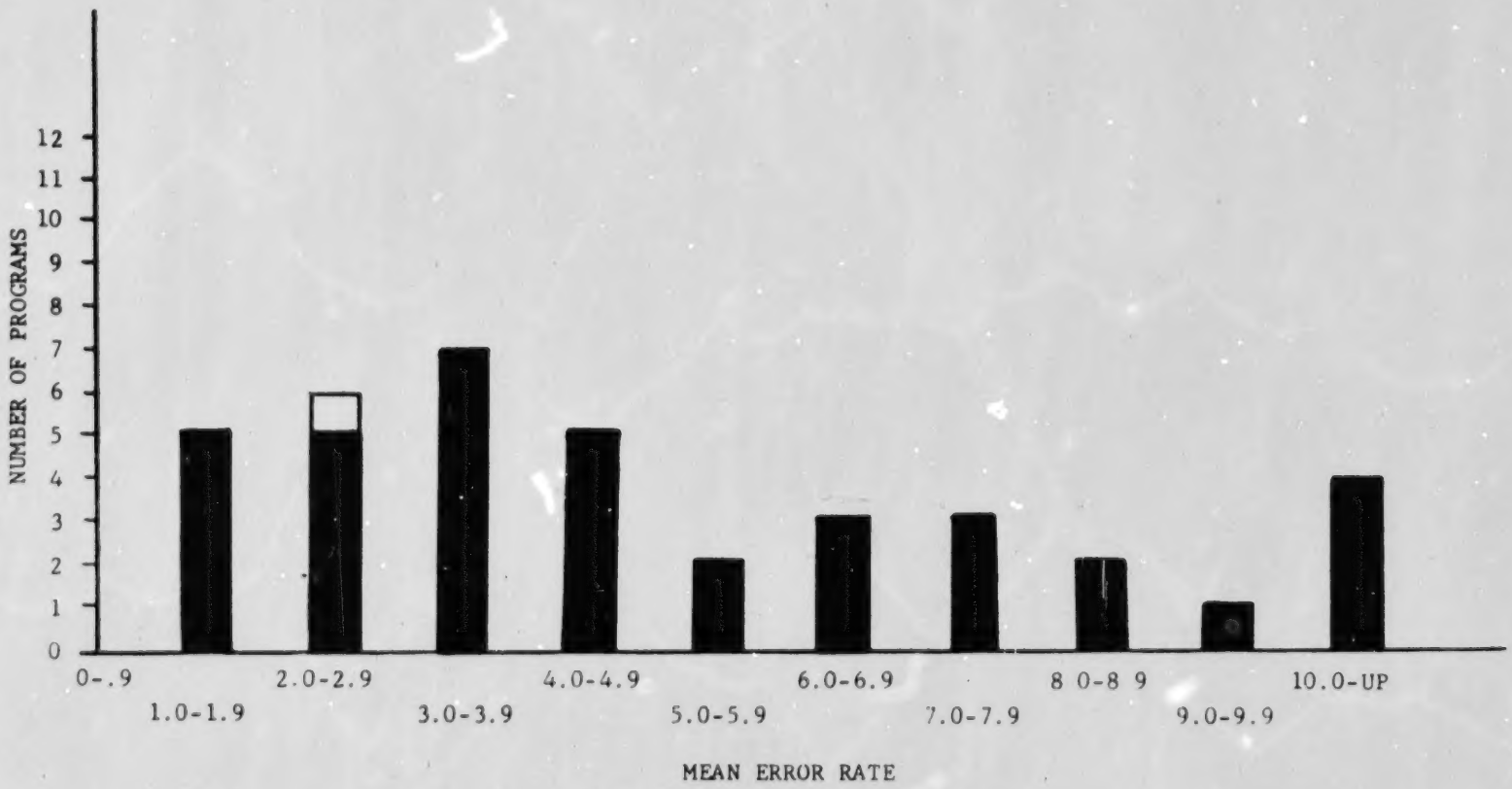

FIG. 2. Frequency distribution of mean error rates for 36 programs previously tested. The non-shaded region is an example of how one may locate the value for a test program for this measure relative to the other programs tested.

8.9 percent and 8.1 percent. In any future revision of this program, efforts should be made to reduce the error rates of these particular books.

The overall error rate of 9.7 percent (Table 65) for Building Reading Power is too high, a fact that is borne out by essentially all of the individual books. (Books CS 2 and CS 4 are notable exceptions.)

In conclusion, Programmed Reading for Adults satisfies the mean error rate criterion, Building Reading Power and Building Your Language Power do not, and the decision on Reading Series is borderline.

Table 62. Mean Error Rate for Programmed Reading for Adults

Book	n	Percent Mean Error
3	6	4.5
4	7	3.5
5	11	4.3
6	9	3.9
7	14	3.6
8	11	3.8
Total	20	3.9

Table 63. Mean Error Rate for Building Your Language Power

Book	n	Percent Mean Error
3	10	19.8
4	10	26.8
5	7	19.7
6	7	10.7
Total	10	19.9

Table 64. Mean Error Rate for Reading Series

Book	n	Percent Mean Error
1	4	6.5
2	8	5.6
3	4	2.3
4	4	5.9
5	6	8.1
6	6	8.9
7	7	10.3
8	7	6.4
9	5	5.3
10	8	4.3
11	5	9.1
12	6	5.8
13	5	6.7
14	4	6.5
15	3	4.8
16	4	5.9
17	5	7.9
18	4	5.9
19	3	7.3
20	1	2.8
Total	17	6.6

Table 65. Mean Error Rate for Building Reading Power

Book	n	Percent Mean Error
CC1	20	14.1
CC2	19	10.6
CC3	19	17.7
CC4	19	10.0
CC5	19	9.6
CC6	19	8.1
CC7	18	7.5
CC8	17	12.0
SA1	14	7.8
SA2	15	8.1
CS1	16	9.1
CS2	14	5.7
CS3	15	8.5
CS4	15	5.0
CS5	14	12.1
Total	21	9.7

PART VIII

CONCLUSION

CONCLUSIONS

In Table 66 are summarized the results for all indices for each program according to whether the evaluation was positive (indicated by +) or negative (indicated by a -). The general impression from the learning data, the primary criterion, is that none of the programs were positively evaluated on all measures. Reading Series and Building Your Language Power failed to lead to a satisfactory amount of learning by all of the indices. There is a suggestion that Building Reading Power leads to a satisfactory amount of learning by the content test measure for the high intelligence students only. Similarly, the high intelligence students on the content tests indicated a satisfactory amount of learning for Programmed Reading for Adults. The most positive learning indication is for the placement test criterion for Programmed Reading for Adults. Within these limits, Programmed Reading for Adults can evidently lead to an adequate amount of learning.

On the criteria of student evaluations, proctor evaluations, and error rates, Programmed Reading for Adults may be judged to be a successful program. Building Reading Power was favorably evaluated by both students and proctors, but it had an excessively high mean error rate. Similarly, the students and proctors favorably evaluated Reading Series, but portions of this program had error rates that were too high. The students favorably evaluated Building Your Language Power, but the proctors did not, nor did the program have a satisfactory error rate. Since Building Your Language Power must be negatively evaluated on all criteria except that for student evaluations, it may be taken as something of a control or comparison condition--the suggestion being that the student evaluation criterion for the Adult Basic Education student is quite uninformative.

Table 66. Summary of Results for All Four Programs' Learning Measures

	CONTENT TESTS					ABLE								
	Over-all	High Intelli-gence	High Moti-vation	Place-ment Test	General Reading Test	Read-ing	Spell-ing	Vocab-ulary	SORT	IRPI Frus-tration	IRPI Words	Student Evalua-tions	Proctor Evalua-tions	Error Rate
Programmed Reading for Adults	-	+	-	+	-	-	-	-	-	-	-	+	+	+
Building Reading Power	-	+	-		-	-	-	-	-	-	-	+	+	-
Reading Series	-	-	-	-	-	-	-	-	-	-	-	+	+	?
Building Your Language Power	-	-	-		-	-	-	-	-	-	-	+	-	-

A final, general conclusion from this research is to emphasize the need to develop more effective reading programs and/or associated tests of reading proficiency. The reason for including both the learning materials and the measures of learning in this statement is that, of course, all our conclusions about learning effectiveness are functions of both the programs and their tests.

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APPENDICES

APPENDIX A

CHARACTERISTICS OF PROGRAMS

DESCRIPTION OF PROGRAMS

A. Introduction

Several sources of information were consulted in an effort to more clearly describe the nature of the four reading programs. The analysis of the observable characteristics, details such as the length of the programs in frames, the use of cueing techniques and the types of responses called for were included in the description to indicate factors which may have had an effect on the students' performance, and also to specify more accurately the four treatments (programs). Critical reviews are also included which describe and evaluate some of the program characteristics.

The internal characteristics common to all the programs are discussed below. Some of these factors were used in the selection procedure and are necessarily common to all programs.

All of the programs consist of a series of booklets used in sequential order after the student begins working with the material. Each has a teacher's manual with a description of the program, with each indicating the program can be used with adults, and suggesting supplementary material and exercises.

The four programs are of the linear-programmed variety, offer immediate feedback as to correct or incorrect responses, and have a variety of frame types, cueing techniques, and modes of written response within each.

B. Validation of Programs

Several sources were consulted to determine what validation with adult learners was available for each program. The Civil Service

Commission Report (1971) lists all four programs and indicates validation as not available. Also, the checklist evaluations by Otto and Ford (1966) cover three of the programs used in the field test, Programmed Reading for Adults by McGraw-Hill, Reading Series by BRL, and Building Your Language Power by Silver-Burdett. Question 39 of their checklist, "materials have been field-tested," is marked negatively for these three programs.

An effort was made by the Adult Learning Center to obtain data from the publishers on field testing and revision with Adult subjects. No data on validation of the programs with adult learners was available.

C. Description of Contents of Each Program

In this section the programs are described as to their component parts, length, types of frames and responses required, grade level, teaching method and cost. The publisher's descriptions were relied on for the basic description and only those components essential to the basic program are described.

Programmed Reading for Adults, authors - Cynthia Buchanan and M. W. Sullivan, published by McGraw-Hill Book Company, Webster Division, New York, New York.

This program is a series of 8 consumable booklets with about 700 frames per book. Only Books 3-8 were used in this study--the earlier books require much teacher supervision. This program has a placement test with items selected from the program. The program is designed to go up to a sixth grade level, with readability from 1.5 - 6.0 (Civil Service Commission Report, 1971).

According to the publisher's catalog information, the student "will learn spelling, punctuation, grammar, word building, nuances of meaning, and syllabication." After completing Book 8 (the last book in the program) he will be able to "read for meaning any material written at the fifth grade level." "He will have mastered a vocabulary of some 1,500 words, and be able to generalize to thousands of other words without memorization of phonics rules." The method of teaching is described as a "linguistic approach" (1971 Catalog of Instructional Materials, 1971).

Building Your Language Power, author - Frank C. Lauback, programmed by William C. Wolfe, Jr., published by Silver Burdett Company (a division of General Learning Corporation), Morristown, N. J.

The Building Your Language Power program consists of a series of six consumable programmed booklets. For this study only Books 3-6 were used because the books below 3 go to the non-reader level and require much teacher involvement. No placement test is provided and the student simply starts in the first book and works sequentially. There are between 300-400 frames per book. The readability level established by the Civil Service Commission Report (1971) is from grade 0.0 - 4.1.

According to the publishers, this program teaches "phonetic spellings, concise rules, and printed and script letters" (open letter from publisher by Thomas W. Hendermarh, coordinator of Special Education Projects, Silver Burdett Company). The Civil Service Commission Report (1971) lists the purpose of the program as "beginning steps in reading to a vocabulary of 1,300 words."

The teaching method described in the Open Letter is through the use of familiar illustrations using phonetic procedures whenever necessary.

Reading Series, author - M. W. Sullivan, published by Behavioral Research Laboratories, Palo Alto, California.

Reading Series is a series of 20 consumable booklets designed for grades 0 to 8 with a readability level from 0.0 - 8.0 (Civil Service Commission, 1971). A placement test is provided which incorporates selected items from the program. Reading Series is the longest program of the four tested, and there are approximately 600-750 frames per book. (See Appendix E for a complete list of the booklets and the number of frames in each.) A necessary component of this program is a series of correlated readers which the student uses after each programmed text.

The program is described as, "Linguistically structured to present the student with consistent development of sound and word recognition. Logical, sequential approach with carefully prepared illustrations in both the programmed texts and correlated readers makes them interesting and appropriate for children, youths, and adults" (Effective Teaching with Programmed Instruction, 1970).

The Civil Service Commission (1971) describes the remediation provided in Reading Series as comprehension, decoding, and spelling.

Building Reading Power, authors - Joseph Loretan and Shelly Umans, published by Charles E. Merrill Publishing Company, 1300 Alum Creek Drive, Columbus, Ohio.

This program consists of three series of reusable booklets with 15 booklets in all. There is no placement test in the program and the

student simply starts in the first book of a series and works progressively. The booklets are relatively short with approximately 35-50 frames per booklet (see Appendix E for a complete list of the number of frames per book). The program is designed for grade 4.5 or higher (Teacher's Manual, 1964, p. 2) and has a readability level from 5.0 - 7.0 grade (Civil Service Commission, 1971).

The publishers describe their program as one which "provides a concentrated remedial reading program, that is self-administering, self-correcting, and self-regulating" (1971 Catalog, Preschool through Grade 12, 1971). The Civil Service Commission (1971) lists specific areas of remediation as word analysis, vocabulary improvement, and comprehension.

D. Cueing Techniques

The usual procedure is the use of a variety of cueing techniques in each program. It is difficult to separate cues associated with each frame from the rest of the immediately preceding program for often even if the student is using the program properly and covering all new answers as he goes, there are still cues and correct responses which he can use from material which has gone before on each page.

The cueing techniques identified in the programs are listed below and are typically used in combination.

(1) Context clues

A. Textual, in which some partial meaning is generally transmitted through the use of a sentence or brief paragraph.

B. Illustrations, where a meaning is transmitted through the use of a "cartoon" or "picture frame."

(2) Partial desired responses where a single letter or group of letters blank for each letter and sometime with a separate blank for each word.

E. Modes and Frequency of Responses

Three modes of response frames were identified as applicable to the programs tested: selection, recall, and practice. A selection type response (multiple choice) is identified as one in which the student is required to write a word or letter from memory, where the correct response is not contained in the frame under study.

A practical frame is defined as one in which the student must merely copy a word or group of letters. There is no requirement other than that the student practice writing the response. A fourth type of frame is identified which requires no response and is labeled as an information frame.

To obtain a better idea of the use of programming techniques which place response demands on the student, an analysis was done to determine the approximate percent of each frame type for each book in the four programs other than the information, no response, frames. The selection, recall, and practice frames were counted for each book in each program and the percentage of each was calculated. Table A.1 shows a summary of percentage of response frame types for each program. Tables E.1, E.2, E.3, and E.4 in Appendix E show the percentage of frame type for each book used in each program.

As may be observed from Table A.1, the percentage of type responses called for were primarily in the selection and recall categories for all programs other than Building Your Language Power. Building Your Language Power utilized extensively practice frame.

Table A.1. Summary Table of Response Frames by Type

Program	Percent Frame Type		
	Selection	Recall	Practice
Programmed Reading for Adults	64	36	0
Building Your Language Power	17	24	59
Reading Series	44	56	0
Building Reading Power	51	49	0

APPENDIX B

PROCEDURES FOR PROCTORS

STEP-BY-STEP ROLE OF PROCTOR

1. Conduct the initial interview (Form 1). During this time and throughout the testing be alert to eye problems of the student.

2. Explain the potential value of the course to the student and demonstrate what programmed instruction is and how it works, cover slides.

3. If this is a new student, familiarize him with the facility and its purpose, other activities going on, restrooms, available refreshments, etc.

4. Administer ABLE Level II Form A - Vocabulary, Reading and Spelling only. If ABLE raw score (number right) in reading is between 23 and 49 inclusive, the student will be in the study. Should the student score below or above these levels, he will not be in the validation study and can be terminated at this time.

5. Begin a file folder for each student.

6. Assign a student number and determine the program he will be in by using the Student Roster (Form 6). If on the Student Roster the student is to be placed in a program that falls outside the range of his ABLE raw score (number right) in reading, move down the list to the next available program in which his score falls. Skipped programs should be filled by the first available student who scores within the ABLE range.

7. Administer the General Reading Test.

8. Administer placement test, if any, for the particular program in which the student is to work and place in the program accordingly - administer the pretest for the book in which he is to begin.* Refer to the Master Check Sheet for each individual program.

9. Instruct the student in the use of the Student Time Card (Form 2) and follow through each visit to be sure he understands and fills it out correctly.

10. After the student has begun his program, administer Standard Progressive Matrices (Raven's)

11. At the completion of the program or when this student must leave the project, and he has completed at least one book, administer the posttests for the particular program in which the student worked. Refer to the Master Check Sheet.

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*Date
Pre_____ Post_____

12. Ask the student to fill out the Student Evaluation Sheet (Form 4). Encourage him to be frank. Explain that he is doing this anonymously. You may help the student understand this form by explaining, defining words, etc.

13. Re-administer the General Reading Test.

14. Re-administer ABLE Level II Form A.

15. Share with the student results of his growth as shown by any of the posttests.

16. When the student has finished the program and all the forms are complete, please place them in a secure file for collection by an Adult Learning Center representative.

SUMMARY SHEET OF GENERAL INSTRUCTIONS FOR PROCTORS

1. Kindly familiarize yourself thoroughly with all tests and programs and procedural forms involved in the study.

2. During the time the student works in this validation program, it is requested that he work in no other reading program or course. If it is necessary for his progress that he take another course, it should be one not specifically designed to teach reading - math preferred.

3. Please make the student aware that we are helping him, and he in turn is helping us.

4. Throughout the testing and program study, guide the student in procedural matters, but offer NO help where content is concerned.

5. Regularly keep track of each student's progress on the Master Check Sheet for Proctors. Check each item as completed. There is a different Master Check Sheet for each program.

6. Under no circumstances should students be allowed to remove programmed materials from the room where instruction takes place. A careful time check must be kept on the use of the material - use the Student Time Card. (Form 2).

7. Kindly specify any course now being studied by the student in addition to the reading program used for this project. Use the Student Course Record (Form 3) to supply this information.

8. At the completion of the program fill out a Proctor Evaluation Sheet (Form 5) for each of the reading programs with which you worked directly.

9. It is most important that all forms, workbooks and tests show clearly the student name and testing site.

10. Please do not go over any of the pretests with the student, because it will affect the student's score on the posttests.

APPENDIX C

RELIABILITY ESTIMATES OF ADULT LEARNING CENTER CONSTRUCTED TESTS

Table C.1. Spearman-Brown Split Half Estimate of Reliability on ALC Constructed Tests

	$\hat{\rho}$	Number Items	N
General Reading	.888	43	50
Building Your Language Power	.757	90	38
Content, Book 3	.601	22	37
Content, Book 4	.795	30	36
Content, Book 5	.333	17	25
Content, Book 6	.198	21	22
Building Reading Power	.806	155	42
Content, CC Book 1	.260	5	39
Content, CC Book 2	.780	11	31
Content, CC Book 3	.830	11	34
Content, CC Book 4	.610	12	23
Content, CC Book 5	.850	13	29
Content, CC Book 6	.581	10	30
Content, CC Book 7	.930	15	29
Content, CC Book 8	.930	12	28
Content, SA Book 1	.787	15	24
Content, SA Book 2	.816	15	24
Content, CS Book 1	.773	5	24
Content, CS Book 2	.148	5	23
Content, CS Book 3	.750	13	24
Content, CS Book 4	.437	8	23
Content, CS Book 5	.449	5	23

APPENDIX D

PROCEDURE FOR ADMINISTRATION AND ANALYSIS OF THE SLOSSON ORAL READING TEST AND INDIVIDUAL READING PLACEMENT INVENTORY

Administration

The procedure for administering the SORT required that the student read as far as possible through 9 lists of words with 20 words per list graded in difficulty. After being informed that the tape recorder was running, the student began reading the words consecutively, stopping when he reached the list where he could not read any of the words.

The procedure for the administration of the IRPI was much the same. The student began reading the six paragraph cards and continued reading until he could not make out any of the words.

For all recordings the student and proctor sat together--the proctor placed the SORT word list sheet and the IRPI paragraph cards one by one in front of the student. The same procedure was used for both pre- and posttesting. The SORT and IRPI were administered in the same session.

Analysis

The magnetic tapes were sent to Dr. Edwin H. Smith of Florida State University for analysis. The standard analysis procedures for the SORT are simple tabulations as follows.

The total number of correct words pronounced were counted in all of the lists and this total divided by two equals the grade level. For example, if a student was able to read 164 words correctly out of 200 words on the test, his grade level would be 164 ÷ 2 = 82 or 8.2 grade level, 8th year, 2nd month.

The mean grade levels for the students in each program were calculated for both the pre- and posttests, gain, percentage gain and C. Maximum Possible Score = 10.0 grade.

The analysis for the IRPI is divided into two parts. First, on both pre- and posttests the total number of words read up to and not including the point where the student makes 10 oral errors on one card were counted. The 10 error point is called "the frustration level," and the expected effect would be that a good reading program should move the student's frustration level up, i.e., he would read more words before he made the 10 errors. The results are shown in the tables for the students in the four programs, in the rows labeled IRPI.

Oral errors were also counted up to the frustration level under the following 14 different categories:

- repetitions
- omissions
- additions
- reversals
- mispronunciations
  - gross
  - wrong beginnings
  - wrong middle
  - wrong ending
  - wrong several parts
- words aided
- self-corrections
- word endings (tense-plural)
  - omit
  - add
  - alter

The oral errors in all categories were summed for each student for both the pre- and posttest. A decrease in the mean number of oral errors would be expected if the programs increase overt reading performance.

APPENDIX E

PERCENTAGE OF RESPONSE TYPES FOR THE BOOKS USED IN EACH OF THE FOUR PROGRAMMED PACKAGES

Table E.1. Response-Frame Types by Book for Programmed Reading for Adults

Book	Percent Frame Type			Cases Sampled
	Selection	Recall	Practice	
3	88	12	0	753
4	90	10	0	706
5	70	30	0	663
6	52	48	0	819
7	44	56	0	878
8	38	62	0	824
TOTAL	64	36	0	4643

Table E.2. Response-Frame Types by Book for Building Your Language Power

Book	Percent Frame Type			Cases Sampled
	Selection	Recall	Practice	
3	25	22	53	426
4	12	24	64	244
5	17	26	57	267
6	13	24	63	244
TOTAL	17	24	59	1181

Table E.3. Response-Frame Types by Book for Reading Series

Book	Selection	Percent Frame Type Recall	Practice	Cases Sampled
1	47	53	0	672
2	47	53	0	574
3	43	57	0	598
4	34	66	0	634
5	22	78	0	610
6	28	72	0	594
7	39	61	0	672
8	43	57	0	704
9	30	70	0	706
10	38	62	0	722
11	45	55	0	728
12	59	41	0	734
13	69	31	0	736
14	61	39	0	736
15	43	57	0	736
16	44	56	0	736
17	45	55	0	736
18	45	55	0	736
19	48	52	0	736
20	51	49	0	736
TOTAL	44	56	0	13,100

Table E.4. Response-Frame Types by Book for Building Reading Power

Book	Percent Frame Type			Cases Sampled
	Selection	Recall	Practice	
CC-1	59	41		37
CC-2	43	57		37
CC-3	46	54		35
CC-4	68	30	2	41
CC-5	57	43		42
CC-6	44	54	2	54
CC-7	47	53		45
CC-8	71	29		41
SA-1	30	70		43
SA-2	44	56		36
CS-1	68	32		37
CS-2	48	52		42
CS-3	65	35		43
CS-4	43	57		42
CS-5	32	68		37
TOTAL	51	49		612